

COAL AGE

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The Good Miner's Prayer

OH POWERS that Be! make me sufficient to mine own occasions. Teach me to know and to observe the Rules of the Game. Give to me to mind mine own business at all times and to lose no good opportunity of holding my tongue.

Help me not to cry for the moon, or over spilled milk. Grant me neither to proffer nor to welcome cheap praise; to distinguish sharply between sentiment and sentimentality, cleaving to one and despising the other. When it is appointed for me to suffer, let

me—so far as is humanely possible—take example from the dear well-bred beasts, and go away quietly, to bear my sufferings by myself. Give to me to be always a good comrade, and to view the passing show with an eye constantly growing keener, a charity broadening and deepening day by day. Help me to win, if I may, but—and this, OH POWERS! especially—if I may not win, make me a good loser.

Amen.



COAL AGE

Apologies to the Good Indian's Prayer, Anon.

Storage-Battery Locomotives at the Grant Mine

BY R. DAWSON HALL

SYNOPSIS—At the mine of the Grant Coal Mining Co., storage-battery locomotives are doing all the gathering work. The superintendent states that each locomotive can, and most do, handle 375 tons per day without difficulty. The average haul is 15 to 16 miles per day.

The storage-battery locomotive has been at once the hope and the query of the mine operator. He has felt on the one hand that it could be made more effective than the mule and so save the employment of men. It also could be constructed to need less traveling room than mules, and, therefore, save brushing. Moreover, it needs

value where the grades were adverse, because its drawbar pull being greater than that of a mule, it could pull a longer trip in cases where with mules the capacity of each unit is all too small. But the same operator has been wondering whether the storage-battery locomotive will pay on a level or on a favorable grade.

STORAGE-BATTERY LOCOMOTIVES ARE PROVING DESIRABLE

It is interesting to note that all these points of question and doubt do not appeal to H. M. Stewart, the general manager of the Grant Coal Mining Co., of Terre Haute, Ind. Very coldly, for there is little enthusiasm



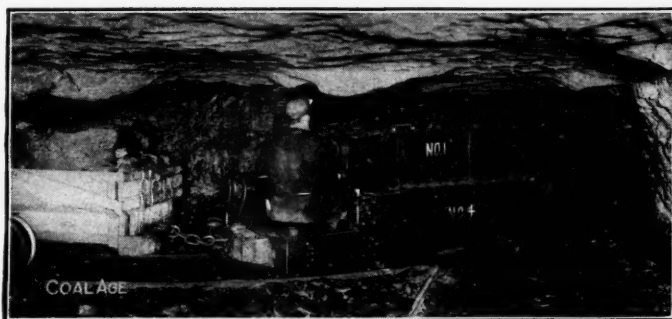
PLANT OF THE GRANT COAL MINING CO., AT NEW GOSCHEN, IND.

no conductors, and hence saves much expense in the erection of wiring, bonding of rails and maintenance of both. Where the roof is bad, the cost of maintenance of trolley wires is no small item and the danger of falling wires causing fires, and perhaps explosions also, is not to be overlooked. Furthermore, even with low-tension currents there is a certain risk in the use of trolley locomotives.

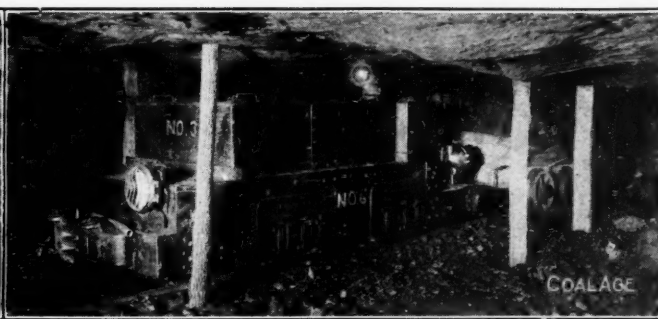
On the other hand, the operator has been wondering if storage locomotives were really reliable, whether they would be more seriously wrecked than trolley locomotives in a collision or derailment, whether in view of their cost they would really be economical, because a costly unit must haul more coal than one which is cheaper if its use is to be justified. In fact, the operator is disposed to believe that a storage-battery locomotive might well prove its

with him, he stated that he had now six storage-battery locomotives, which he had acquired at first one by one and then by twos. He added that he was about to buy two more like those he had already purchased, and he stated that the locomotives would gather 375 tons per day of 8 hr., doing as he estimated it, the work of four or five mules.

Of course, some management is required to prevent interference between storage-battery locomotives, though not so much as between smaller units like mules. Furthermore, care must be taken to save long runs in gathering and to prevent the combining of two or more remote districts in the delimiting of territory to be served by a single locomotive. The problems are not different from those relating to mules, where storage-battery locomotives are involved; but to get record runs favorable conditions must,



STORAGE-BATTERY LOCOMOTIVE PULLING CARS OUT OF ROOM NECK INTO A ROOM ENTRY



LOCOMOTIVE RUNNING ON LOWER FLANGE OF RAIL, TRACK NOT NEEDING BONDS MAY BE OF IMPERMANENT CHARACTER

of course, as everywhere, be provided. Perhaps a few notes about the Grant mine may serve to explain conditions.

THE GRANT COLLIERY

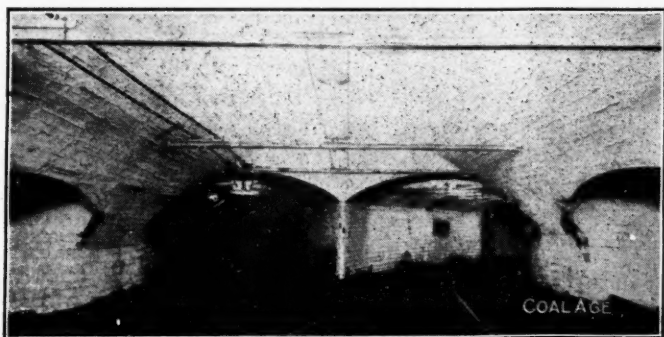
The shaft is 272 ft. deep and is sunk in a country which is comparatively flat. The seam worked is No. 5. That and No. 4 are the two seams most generally operated in the Indiana "bituminous-coal" district. (The custom seems to be to class the "block" coal by itself, though, of course, it is as bituminous as the other.) The coal measures from 4 ft. 8 in. to 5 ft., the average being about 4 ft. 10 in.

The illustration will show that the mine is in most details strictly uptodate. The shaft is concreted; the headframe designed by Allen and Garcia is of steel, stiffened in places with concrete. The rough finish on the power house, it is true, shows the lines of the forms and gives the impression of wood, but that is deceiving, as the walls are concreted.

The bottom and workings were laid out by Rush and Everson, engineers of Terre Haute, Ind., and as a result of careful planning, three men on the bottom handle 1700 to 1800 tons per day. There is a Holmes lift for empty cars, and the caging is done by Bowerston automatic caging machines.

METHODS OF WORKING IN INDIANA

Indiana is a strong Union state, and the agreements with the Union have made it hard to operate the mines of Indiana with anything like due regard for conservation and even of safety. This is no place to discuss whether the burden of proper methods of mining should fall on operator or miner, and it is only necessary here to state that the rooms are from 21 to 24 ft. wide and the pillars 9 ft.

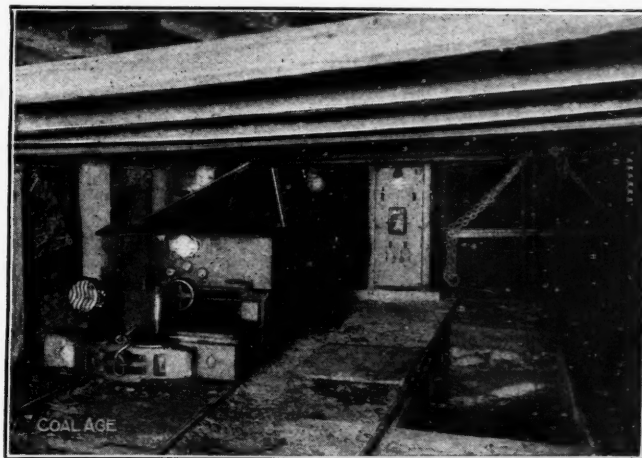


SHAFT BOTTOM AT GRANT MINE

There have not been wanting those who wonder why the Indiana roof is so troublesome and so ready to squeeze, and that several men have been endangered by sudden movements of the roof, but the reason is so obvious that one forebears to point it out. With such weak room pillars and with chain pillars only 24 ft. wide in the headings, and rooms widened from quite close to the entry, what else could be anticipated? Yet we think that in choosing the Grant mine, we have chosen one of the most favorable illustrations of Indiana practice, for more than usual care is shown in all details of the plant.

A NEW METHOD OF WORKING

Yet, if a digression may be pardoned, there is an exhibit of a sense of the importance of good pillars at the mines



THE CAR BARN WITH CHAIN HOISTS FOR REMOVING BATTERIES

of the Bunsen Coal Co., Universal, Ind., where the room centers are 66 ft. apart, and the rooms being 21 ft. wide, the pillars are 45 ft. thick. The crosscuts, it is true, between rooms are for the most part 18 ft. wide and to comply with the somewhat too drastic law, are only 45 ft. apart. This width of break-through is adopted to avoid payment for driving a narrow place. Every 200 ft. the crosscuts are made narrower, only 12 ft. wide, and are driven by sights, and all the rooms are also so driven.

These crosscuts being opposite continuously from room to room, serve as counters, such as are driven in the anthracite region. The coal is hauled out by these to the cross entries, and the parts of the rooms thus cut off are abandoned till the time for drawing pillars arrives. The rooms are thus driven on till the boundary is reached.

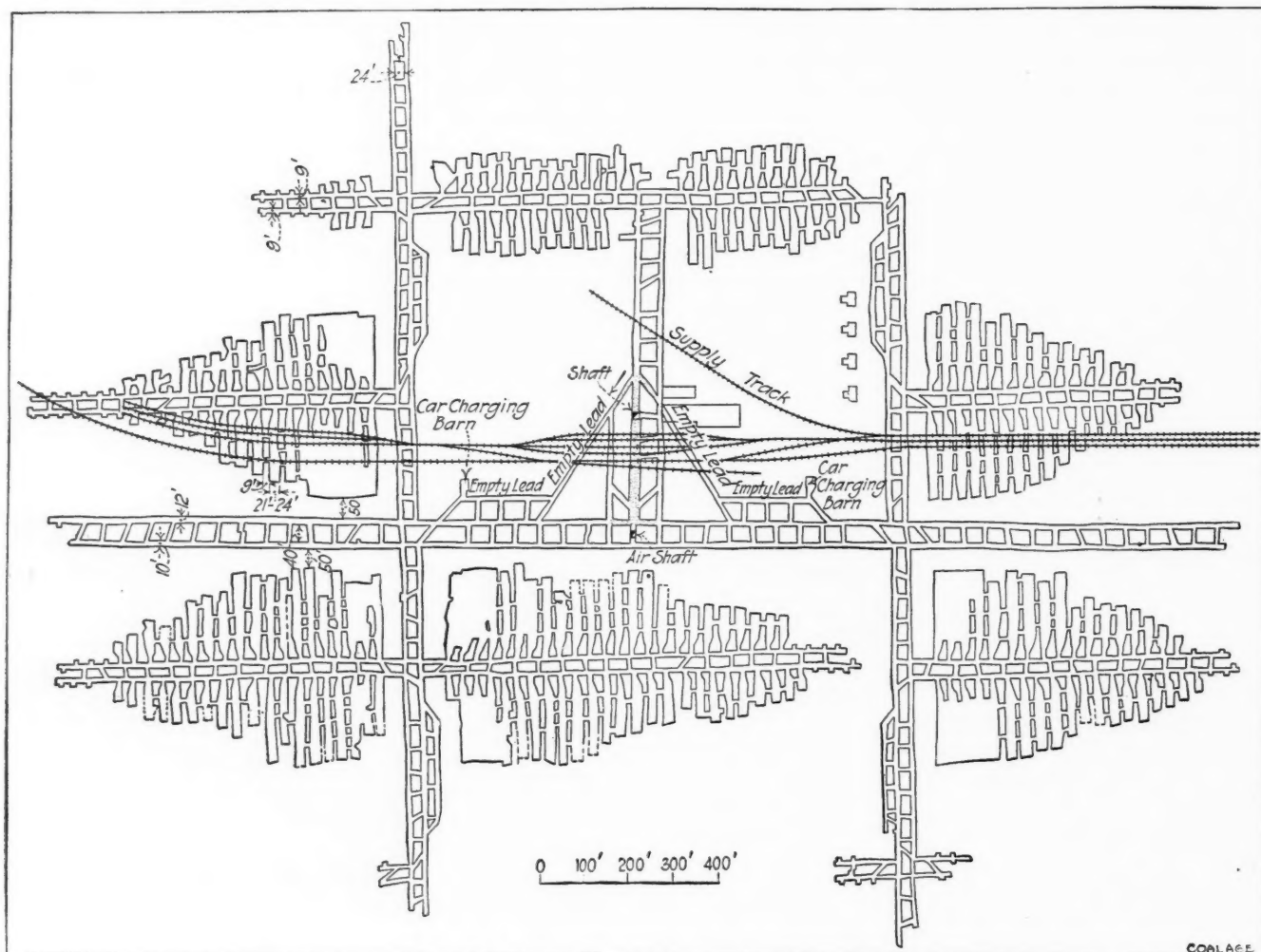
So far no pillars have been recovered. That work, however, should not be difficult, as the first mining has been so conservative. However, the roof gives quite a little trouble when it gets damp, and this may cause some trouble if damp air is allowed to circulate through the parts of the rooms which are thus temporarily abandoned.

There is no reason to believe that the problem of the main roof in Indiana is any worse than that elsewhere. It would be solved at once if the idea that adequate support is needed, were boldly faced. It was interesting and pleasing to be told by a superintendent that chain pillars are almost worthless, and that flanking pillars

the 43-in. height of the storage-battery locomotive gives it an advantage over the mule, though sometimes where a slight sag makes it necessary to boost the track, the height becomes somewhat scant, for though the coal is always 13 in. thicker than the locomotive is high, there is an allowance to be made for rail and tie.

HAULAGE AT GRANT MINE

The main haulage of the Grant mine is by two trolley locomotives, one a 7½-ton Goodman, and one a 10-ton Westinghouse. These pull from the double partings in the cross-entries and deliver their coal at the shaft bottom.



MAP, SHOWING CONVENIENT MINE LAYOUT. THE STIPPLED AREA AT THE SHAFT BOTTOM SHOWS THE CONCRETED SECTION

could alone save an entry. Such a statement should be a platitude which everyone should believe, but you could count the people who adhere to it and practice it on the digits of your two hands.

THE DRAWSLATE CONDITIONS ARE BAD

The roof in Indiana seems to be of a character that makes the use of moistened air prohibitive. In one mine the reversal of the current is alleged to have done much to reduce falls, and it is the annoyance, cost and danger of falling trolley wires, which is, in part, making the trolleyless locomotive look so desirable in the State of Indiana.

The bottom at many of the mines is quite hard, and it is impossible to make height by shooting. Consequently,

The gathering locomotives draw from the faces of the rooms. They go into one room entry and find all the cars loaded. They draw these and go into the same entry with empties. They leave these at the mouths of the rooms and then go into another entry and draw loads there.

The power by which the trolley locomotives are propelled and the storage-battery locomotives charged is provided by one 100-kw. Goodman Manufacturing Co. electric generator, running at 250 r.p.m. and generating 364 amp. at 250 to 275 volts pressure. This is driven by a McEwen engine 16x16 in., with a rated capacity of 137 hp.

The boilers are five hand-fired Terre Haute Boiler Works units, producing 750 hp., using good run-of-mine coal. Here, perhaps, is the one point where the plant is

not uptodate. The headings are driven by puncher machines, and the compressed air for this work is provided by two Ingersoll-Rand compressors. The machine shop is unusually well equipped, there being a hammer, emery wheel, planer, hack saw and two drill presses, all power-driven.

THE STORAGE-BATTERY LOCOMOTIVES

A storage-battery locomotive was first installed in May, 1913. In September of the same year, another was added, in November two more were purchased, and in July of this year yet another two, and it is said two more are to be ordered. The locomotives have needed little or no repairs. Derailments and collisions—the first not infrequent—do the locomotives no greater harm than if they were propelled by trolley.

The locomotives pull from 12 to 14 trips per day, bringing on each occasion 12 to 18 cars. The net load on these cars runs from 3500 to 4000 lb. per car, and the wagon itself weighs about 1600 lb.

The locomotives weigh 5 tons, of which 1900 lb. is due to the weight of the battery, which consists of 63 cells. When these are charged, they have a capacity of 300 ampere-hours. The track gage is 42 in. The cells used are made by the Edison Storage Battery Co., of Orange, N. J., and the locomotives are manufactured by the Jeffrey Mfg. Co., of Columbus, Ohio.

With the storage battery jogging along unflaggingly over the rails at 5 or 6 miles per hour, and pulling any load likely to be placed behind it, it is really largely a matter of management whether the locomotive does as many times as much as a mule to justify its use. The storage-battery cells, whether Exide or Edison, appear to be giving satisfaction, giving both reliability and the power desired. They are built to withstand overloading, overdischarging and mechanical violence. There will be a further reference to these locomotives in an early issue.

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Handling Tonnage Bulletins for Machine Mines

BY H. H. WARNER*

Various systems have been used to handle machine tonnage, both on the mine bulletin or tippie sheet and on the payroll, but one that eliminates unnecessary office detail is set forth herewith:

In starting this system, use check numbers from one to as high as necessary to accommodate the operation of the mine in question, and as these check numbers are issued, enter on the bulletin above the check number the number of the machine the loader is to work after, i.e., issue check numbers just the same as if it were a solid operating mine, with the exception that the machine number is entered above the check number.

The weighmaster in this case posts his tonnage as it arrives in the regular way and at the close of the day's business, he adds through his bulletin beginning with machine No. 1 and summing up their tonnage, machine No. 2, No. 3, etc., and as the final check against his separate machine addition, he makes complete addition of his bulletin beginning at check No. 1. He posts on his bulletin a recap of the machine tonnage from his machine addition, so that the office can post the machine tonnage to the machine runners without having to make another addition.

In case a loader is changed from one territory to another, or from one machine to another, he places upon the first car loaded from the new territory a machine number, together with his check number. For instance, if check No. 36 was loading according to the present bulletin on machine No. 1, that number would be posted above check No. 36 on the bulletin. If he was transferred to machine No. 5, at any time, the first car he loaded from this territory would bear a No. 5 machine number and when this car reached the weighmaster, he would enter No. 5 after the last car received from No. 1 territory and the loader's tonnage from that time on would be posted to No. 5 machine. It is a very good idea to use either red or blue pencil in placing the machine numbers over the loading-check numbers, as it helps considerably in adding the separate machine tonnage.

When this bulletin reaches the office to be posted to the payroll, the payroll clerk begins at check No. 1 and posts straight through his payroll and the grand total of all the payroll loaders' tonnage should equal the grand total of the bulletin. When posting the machine tonnage, it will be necessary for him to split this tonnage as shown by the weighmaster between the runners on the various machine territories, for instance, No. 1 machine is double shift, four men working on same, the tonnage shown on the bulletin for No. 1 machine will be split by four and the separate amounts posted to the credit of each runner's account.

Where solid coal is loaded with machine coal, the letter "S" is placed on the bulletin above the loading-check number instead of machine number. This tonnage is carried the same as machine tonnage on the recap of daily bulletin.

This system is superior to the system where the first fifteen numbers on the bulletin are for No. 1 machine, the next fifteen for No. 2, etc., as it eliminates the necessity of changing the loaders' check number at the time he may be changed to a different territory.

To demonstrate, loader No. 5 is loading on No. 1 machine and during the day receives notice from the mine manager to change his working place and begin loading after No. 4 machine. With the last mentioned system, it would be necessary for him to come on top, get in touch with the office and have his loading check changed to some check number that was vacant on No. 4 machine before he could resume his work. Furthermore, when this change is made the fellow is carried on the payroll as having worked on No. 1 machine. Later, he may be given still another number on the payroll, and there are quite a few times when this becomes very confusing to the office in posting the loader's supplies, union dues and assessments.

Invariably when the pay is closed the payroll clerk will wind up on pay day with two or three different pay envelopes for the same man. The system outlined above eliminates any changes in the office work relative to the pay of any particular loader, and he retains the same check number and is carried on the payroll in the same place at all times.

The weighmaster takes care of the details outlined and carries a semi-monthly pay bulletin both for machine runners and loaders. This bulletin is posted each and every day for inspection, and by doing this, there is no question as to the correctness of the tonnage carried on the payroll for each individual. Any differences that come up before the pay is closed are handled through the weighmaster for correction.

*Chicago, Ill.

The Purchase of Coal on Specifications--III

By F. R. WADLEIGH*

SYNOPSIS—This third installment takes up in detail a study of the effects of sulphur on the actual value of the coal to the consumer. The importance of designating specific sizes is also shown. Two samples of typical specifications are given, one being for the standard proximate method, now so commonly used, and the second a more exhaustive and comprehensive type.

Perhaps one of the most glaring inconsistencies in many specifications now in use is the attempted regulation of the amount of sulphur in the coal, with the infliction of absurd and unfair penalties for a small increase above the standard. In the first place, the coal operator or seller cannot control the amount of sulphur in his coal.

Professor Lewes states that the original source of sulphur in coal is probably calcium sulphate, which exists in the ashes of vegetation and remains in the coal ash. Under the influence of temperature, pressure and heat in the presence of carbonaceous matter, the sulphate becomes reduced to sulphide, which combines with the iron salts and forms sulphide and disulphide of iron (iron pyrites).

Sulphur is present in coal in several forms, as a sulphate of lime, (gypsum) pyrites (rarely as marcasite) and as organic sulphur, the latter in compounds about which little or nothing is known, where the sulphur is combined with carbon and hydrogen; the organic sulphur varies in different coals from 2 to 75 per cent. of the total sulphur. (Lewes, "Carbonization of Coal.")

Of these various forms of sulphur, only the amount of iron pyrites can in any way be regulated by the coal operator and that to a limited extent only. The gypsum comes in thin layers or scales along the cleavage planes of the coal and cannot be removed in mining.

The organic and free sulphur cannot, of course, be removed but at any rate it is all driven off when coal is burned. The iron pyrites comes in balls and lenses, or layers and small scales, distributed throughout the coal; much of this can be removed at the mines by washing unless it is in small scales.

EFFECT OF SULPHUR IN THE BOILER PLANT

Sulphur has a heating value of from 4050 to 5300 B.t.u., depending upon its form, whether organic or iron pyrites. Dioxide of sulphur with water forms sulphurous acid which may corrode any metal it comes in contact with, but this action only takes place after cooling of the gases of combustion. The action of sulphur in pitting or corroding boiler surfaces has been greatly exaggerated and may be practically neglected. The same applies to its action on grate bars, except in rare instances.

The percentage of sulphur in coal is no indication of its tendency to form clinkers. This is clearly proved by the tables given in the preceding installment†, showing the ash fusing temperatures with amount of sul-

phur, for various coals. There is no relation between the percentage of total sulphur in the coal and either the amount and kind of clinker or the ash fusing temperature.

Sulphur and Spontaneous Combustion—Fires in coal piles or bins from spontaneous combustion, are believed by many users to be due to sulphur in the coal. The theory that spontaneous combustion of coal may be caused by the oxidation of iron pyrites or sulphur has been held for a number of years, regardless of the fact that coals with less than one per cent. sulphur are known to be extremely liable to spontaneous combustion. As long ago as 1864, Dr. Percy pointed out that pyrites has little to do with spontaneous combustion, a fact later confirmed by Dr. Richter.

The U. S. Bureau of Mines, in Technical Paper No. 16, states that sulphur has only a minor effect on spontaneous combustion, in most instances. Numerous samples of coal taken from the hottest parts of a burning pile or bin showed that in no case was the unoxidized sulphur less than 75 per cent. of the average original total sulphur in the coal. The two great English authorities on this subject, Professor Lewes and Dr. Harger, both state positively that sulphur can have little to do with originating spontaneous combustion.

Therefore, no specifications for steam coal should include the sulphur content as a basis for payment. The U. S. Government specifications have no sulphur limit or percentage, except in the general description of coal, but there are a number of other specifications now in use that penalize the seller for a variation of $\frac{1}{4}$ of 1 per cent. Even if sulphur has anything to do with clinkering and thus increasing the cost of plant operation, such a small increase could not possibly be measured.

No specifications in use, in this country, so far as I know, take into account the size of the coal, in the way of specifying a percentage of small coal, dust, or slack and penalizing or giving a bonus on such basis. It is true that some contracts require the absence of "dust," but only in a general way is such requirement mentioned.

In other countries, this item is made of considerable importance in all specification contracts. This difference in practice is largely due to the fact that a great part of the steam coal used in this country is run-of-mine, while abroad it is nearly all sized by screening.

TYPE OF CONTRACT WITHOUT SPECIFICATIONS

Should there not be a standard for run-of-mine coals used in this country as regards percentage of lump and slack? We know that the size of coal has an important effect in combustion results, a fact that is given much more weight abroad than here. As an example of this, see for instance, the specifications for the purchase of coal for electrical works as agreed on between the large London coal contractors and the Associated Municipal Engineers, which will be given in a succeeding article.

The old method of coal purchase, by name or reputation, still the most largely used, can and does give good results. A standard contract of this kind on which mil-

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†Coal Age, Vol. 6, p. 424.

lions of tons have been and are being bought is as follows:

(City) 191
.....
Bought of
(Subject to conditions endorsed hereon)
.....tons of 2000 lb. of.....Coal.
@\$.....per ton of 2000 lb. f.o.b. cars at
mines

This contract shall cover fuel requirements of.....
.....for term of.....from.....191
but shall not exceed the tonnage stated above without the
written consent of(Selling Company).

Any portion of this tonnage not shipped by.....
on which date this contract will expire, shall be canceled.

It is agreed that the monthly requirements under this
contract shall be about as follows:

.....
.....
.....

Terms of payment, cash on or before the 12th of each
month for all coal shipped during the preceding month. Bills
subject to sight-draft if not paid when due.

Every effort will be made for the fulfillment of this con-
tract, but the sellers will not be responsible for same during
any war affecting it, or if prevented by strikes, or combina-
tion of miners, laborers or boatmen, accidents at the mines, or
interruption or shortage of transportation or navigation, by
any cause or any occurrence. In such case the obligation to
deliver coal under this contract is canceled to an extent cor-
responding to the duration of such cause, occurrence, inter-
ruption or shortage, and no liability shall be incurred by the
sellers for damages resulting therefrom.

.....Railway Company's scale weights
at point of shipment are accepted as conclusive.

Another kind of specification is that which gives: A
standard analysis and limit of constituents; provisions
for sampling each shipment of some certain size; scale
for penalizing inferior coal.

No analysis is made unless coal gives inferior results
in actual use, in which case the sample of that particular
shipment is to be analyzed and payment based on results
of such analysis according to scale of penalties. If the
analysis shows coal to be within the standard limits given,
then no penalty is to be affixed and the inferior com-
bustion results are assumed to be due to poor handling
or condition of equipment. The following is a typical
example of such a specification:

**SPECIFICATIONS AND CONTRACT FOR FURNISHING
—TONS OF BITUMINOUS COAL**

By and between The.....a Corporation of the
State of Pennsylvania, hereinafter called the consumer.

This contract shall cover the full requirements of the
.....Co., for a term of.....from
.....to.....

Description of Coal to be Delivered

Run-of-mine semi-bituminous coal, having an analysis ap-
proximately as follows, which analysis shall be taken as the
standard for all coal delivered under this contract:

Moisture 2.5
Volatile not to exceed (dry coal)..... 18.00
Fixed Carbon 72.00
Ash not to exceed (dry coal) 8.00
Sulphur (dry coal) 1.5
B.t.u. (dry coal) 14,300
Ash fusing temperature, not lower than 2500° F.

Commercial name of coal.....
Name of mine or mines.....
Location of mine or mines.....
Name of coal bed or seam.....

The coal to be furnished under this contract is to be de-
livered by the contractor on cars at the plant of the.....
at....., and is to be of the grade and kind described
in the specifications.

It is understood and agreed that the Company will de-
liver under this contract as much coal of a size not to ex-
ceed 4 in., that is, coal that will pass through a 4-in. per-
forated screen, as it may desire, in quantity not to exceed the
total tonnage called for by this contract; such 4-in. coal is to
come from the same mines and to have the same approxi-
mate analysis as the run-of-mine coal described herein.

Deliveries

Coal shall be delivered at the rate of.....tons
per week until the whole quantity has been delivered.

All deliveries to begin within ten (10) days after the
signing of this contract.

It is understood by and between the parties hereto that
the intent and purpose of this contract and of these specifica-
tions is to obtain for the consumer, during the life of this
contract, a continuous supply of fuel, constant as to quality
and delivered as the needs of the consumer require.

It is agreed that the failure on the part of the company
to furnish coal of the quality described in this proposal on
three consecutive deliveries, or in case more than 20 per cent.
of the coal up to any date during the life of the contract has
been of a quality below the standard and subject to rejection
under this contract, this contract may, at the option of the
company, be terminated.

It is agreed that, if for any reason, the Contractor fails to
deliver coal in accordance with the terms of this contract, the
company may buy coal in the open market and charge
against the contractor any excess in the price of the coal so
purchased over the contract price, or, at its option, the com-
pany may cancel the contract.

Causes for Rejection

It is understood and agreed that this contract shall not be
binding if at the end of a service of ten days duration, the
coal fails to give satisfactory results because of excessive
clinkering, when burned in a hand fired furnace, at a rate
not to exceed 25 pounds of coal per square foot of grate sur-
face per hour.

Each car of coal delivered will be sampled by a repre-
sentative of the.....Co., at their option.

(The method of sampling to be used is here specified).

If the coal from any car gives unsatisfactory results in
actual use under boilers, the samples taken from such car, at
the option of the consumer, shall be sent to.....
for analysis.

Should any analysis show that the coal was inferior to
that called for by the standard analysis given in this con-
tract, than a reduction in price per ton shall be made on the
coal contained in the car from which the sample was taken.

It is understood that the analysis of any sample is not to
be used to regulate the price from month to month, but only
where inferior coal has been delivered and in such cases the
amount of reduction shall be determined by such analysis.

**Basis for Reduction from Price on Account of Inferior Coal
as Shown by Analysis**

Ash. (Standard 8%)	Per Cent.	Deduction per ton (cents)
8.01 to 9.00		2
9.01 to 10.00		4
10.01 to 11.00		7
11.01 to 12.00		13

B.t.u. (Standard 14,000, dry coal)

Variation of 50 B.t.u. correction in price will be deter-
mined by the following formula:

$$\frac{\text{delivered B.t.u.}}{\text{standard B.t.u.}} \times \text{standard price} = \text{price resulting from B.t.u. correction}$$

Degrees F.	Deduction (cents)
2499-2450	1
2499-2350	2
2399-2350	4
2349-2300	8
2299-2250	15
2249-2200	25
2199-2150	40

The company agrees to use the utmost diligence to keep
the consumer fully supplied with the quality and quantity of
coal specified during the life of this contract, it being under-
stood that sufficiency of supply and quality of coal are of the
utmost importance to the Consumer.

The company shall not be liable under this contract for
failure to deliver or for any delay in delivering said coal if
he is prevented from or delayed in doing so by strikes or
combinations of miners or laborers occurring at the mines of
the.....or upon any railroad over which the
coal must of necessity be transported to reach its destination,
or in case he is prevented or delayed by delays in transporta-
tion, or by other causes wholly beyond his control.

In case the output of the said mines is reduced by reason
of any said causes but not wholly prevented, then the Con-
sumer shall be entitled to receive under this contract the
same proportion of the coal so mined as the total amount of
coal required to be delivered under this contract bears to the
total amount of the coal that the Contractor is required
to deliver all the coal required to be delivered hereunder,
he agrees to use his best endeavors to keep th Company sup-
plied with coal of good quality at such prices as may be
reasonable under the circumstances.

The Consumer shall have the privilege of testing other

coals to an amount not exceeding ten per cent. of the total tonnage to be delivered under this contract.

The undersigned hereby agree to deliver the coal as described in tons of 2240 lb. in quantity as previously specified and in strict accordance with these specifications.

Weights

All payments shall be based on railroad weights.

Payments

Payments for the coal delivered will be made at the price specified in this contract, less any deductions for inferior coal as elsewhere specified. Such payments for the coal delivered under this contract shall be made on the..... day of the month following that on which coal is delivered on the Consumer's tracks.

In 1908, the American Society for Testing Materials took up the question, with a view of putting out standard specifications for all classes of coal and for different uses, steam making, gas manufacture, metallurgical work, etc., and appointed a committee of about 50 members, divided into nine sub-committees, to frame suitable specifications. This committee was made up of leading representatives of the mine operators, of the consumers and of chemists and engineers.

For various reasons, this committee has not as yet agreed upon any standard specifications, partly because it was recognized that the whole subject was a large and growing one, that changes in methods of analysis, greater knowledge of coals and their sampling, alternations in plant equipment and operation, all made it advisable to postpone final action for a time. Differences of opinion as to what items should be embodied in the specifications added to the difficulty. The following quotation is from their preliminary report, presented to the Society at its annual meeting in June, 1910.

The committee recognizes the growing interest in the general subject of the purchase of materials under specifications; and it is believed that in all cases where a rational basis for such specifications can be agreed upon the results of such practice must be beneficial to both producer and consumer, as it enables the consumer to point out more specifically just what he wants while the producer can bid in a more intelligent manner; in addition it facilitates more suitable settlements.

Your committee desires to emphasize certain reforms which are regarded as fundamental accompaniments or outgrowths of the present movement for specifications, and which are essential to the welfare of the coal industry in the United States, namely:

(1) A classification of coals with respect to fuel efficiency, the adaptation of equipment to coals for obtaining the greatest efficiency from the different varieties, the continued use at each plant of that type of fuel best adapted to the equipment, the use of the low-grade fuels either at the mines or within short distances, and the use of the high-grade fuels under conditions demanding highest efficiency and requiring distant transportation.

(2) Special efforts on the part of architects and engineers to provide adequate space for power and heating plants and proper equipment, with a view of making the most efficient use of the fuels that are most available.

(3) Such readjustment in the prices at the mines of the different classes of coals as will render possible clean and safe mining, and the use at local or distant points of all grades of coal worthy of being placed on the fuel list.

Settling Sump for Mine Pumps

By THOMAS G. FEAR*

Cleaning the sump in a mine is anything but a pleasant job, as all who are familiar with mining operations know. To the mine owner, furthermore, it usually means an increase on the cost sheet, due, usually, to the fact that the cleaning must be done between shifts.

The accompanying sketches show how the sump for the main pumping station can be kept practically free from

all foreign matter, such as particles of coal, slate and wood.

On one side of the main sump, a shallow sump is made, not exceeding 2 ft. in depth, and separated from the main reservoir by a concrete wall about 6 in. lower than the top, or high-water level.

The water from the mine is either ditched or pumped into the "settling sump," where the coal or rock is de-

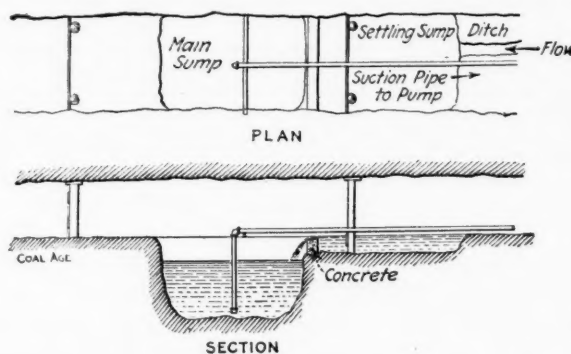


FIG. 1. PLAN AND SECTION OF SETTling AND PUMP SUMPS

posited, and the clear water flows over the wall into the main sump. A 1x12-in. board, used as a baffle, will prevent pieces of wood from being carried into the main sump.

The settling sump can be cleaned periodically by the pumpman, during the regular working hours, and the life of the valves in the pump increased materially, as the cutting of these parts is due almost entirely to the amount of foreign matter in the water passing through the machine.

Fig. 2 shows a method of protecting the suction of a pump drawing its supply from a temporary sump.

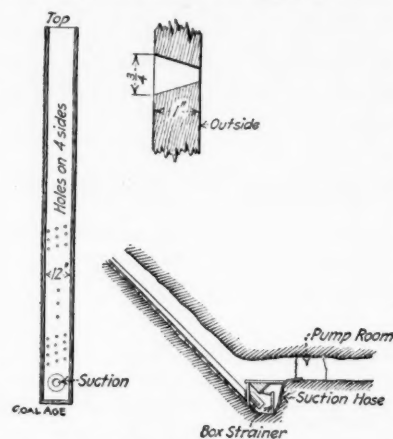


FIG. 2. METHOD OF PROTECTING THE PUMP SUCTION IN A TEMPORARY SUMP

When the pit filled up, the water level rose, and the water entered the box higher up, the taper in the holes preventing the coal from entirely choking them up.

The heat radiating surface of any electrical conductor varies as its diameter, while the current-carrying capacity varies as the square of the diameter. In consequence, the current density in large conductors will be less than in small for an equal temperature rise. It has been found impracticable on this account to use insulated conductors larger than two million circular mils except in special cases.

*Tennessee Coal, Iron & R.R. Co., Birmingham, Ala.

The Victoria Mine at Lunen, Germany

By F. SCHULTE

SYNOPSIS—A detailed description of one of the most modern of European mines. The production averages about one ton of coal per man per day, which is far below the individual production of miners in America. The sociological arrangements are unique and quite complete. Electrical hoists were not considered on account of greater first cost.

At present the daily output of the Victoria Mine, at Lunen, Germany, is about 2600 tons, with 2700 workmen on its payroll.

The general arrangement of the respective buildings and workshops, as finally accepted after several changes

which faces the village, the first room to be met is the checkroom. The rooms for the foremen and manager follow, with windows on the square and doors opening upon the central payroom, which is further surrounded by the offices for the mine boss and the pay clerks. Leaving the payroom, the main corridor leads to the mine shafts, and, on the right of this passage are the pickrooms and the storeroom for giving out the supplies.

On the second floor, reached by the main entrance, the room nearest the stairs is given over to the superintendent, who, from his windows, has a general view over the plant. The offices facing the square are occupied by the pit manager, surveyor, machinery superintendent

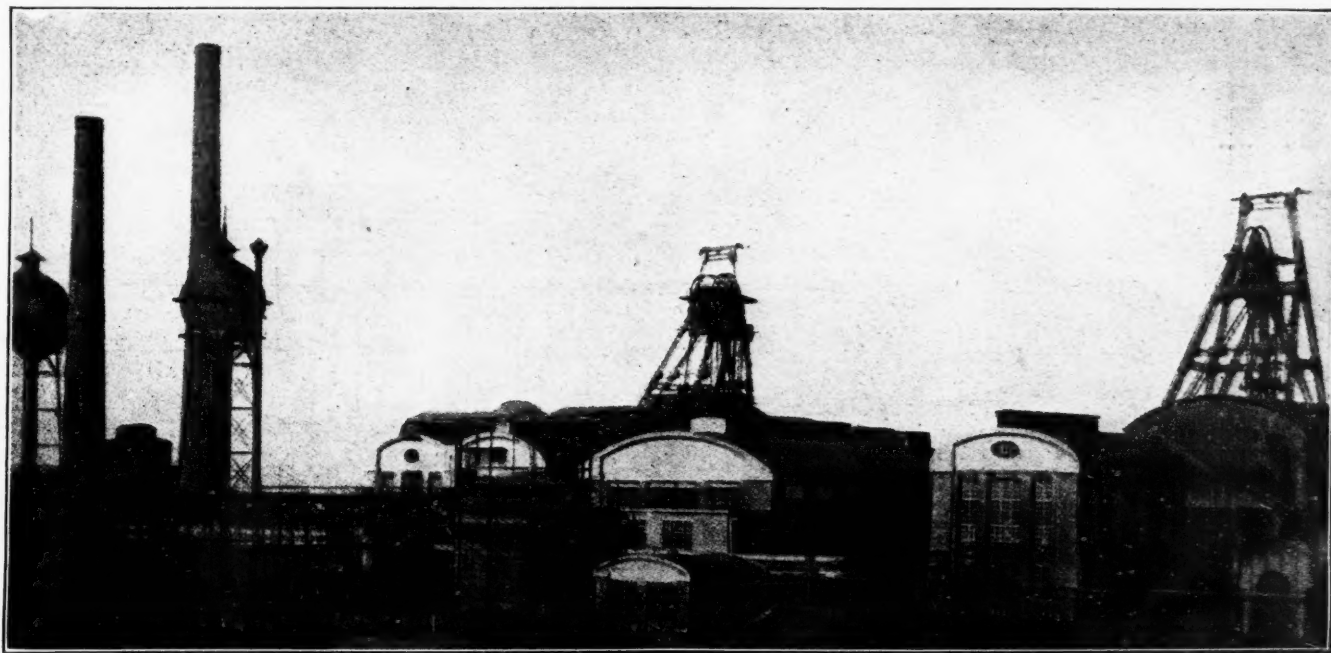


FIG. 1. GENERAL VIEW OF THE SURFACE PLANT

had been made while the shafts were being sunk, is shown in the plan, Fig. 2, Fig. 1 giving a photographic view of the plant.

The building, which serves both for administration purposes and for the comfort of the men, is found near the entrance to the mine, on the open square at the center of the village. Through this building the mine shafts, Nos. 1 and 2, are entered by crossing the foot bridge over the railway tracks. The main haulage shaft is No. 1, situated close to the screen house and the loading station, while further westward are the washery and the coal tower.

The buildings for the hoisting engines are south of each shaft, on opposite sides of the machinery building; directly beyond the hoisting-engine building of shaft No. 1 are the direct-fired boilers, with the gas-fired boilers further to the west, adjoining the coke ovens and the byproduct factory. To the eastward are the general workshops and the dump is near the river Lippe.

THE ADMINISTRATION AND MINE BUILDINGS

Entering the main office or administration building,

Note—Translated in abstract by Henry B. Binsse from "Glückauf."

and draftsmen, and, on the other side of the hall are the bookkeeper and the head clerk. The baths for the officers and foremen are further along the hall to the left, the lamproom being on the right hand as the men go toward the shaft entrance. The lamps are handed back on the other side of the lamproom by the men returning from work and leaving the building on their way homeward.

The Miners' Building contains locker-room for 2403 men, 118 ft. long by 66 ft. wide; on opposite sides are the shower rooms, 14½ ft. wide. To warm the water for the showers, it is fed into an elevated tank, whence it is forced through a heater, and then pumped back into the tank, the circulation being kept up until the desired temperature has been secured. The water flows by gravity to the showers. The heating system for the building is by hot water and forms part of the bathing system, so that there is no steam anywhere, as will be described later.

It was sought, in planning these buildings, to so arrange these rooms and passages that the movement of travel should be subject to no interruption. The men going to their work pass along a special stairway to the lamp delivery room, thence to the covered foot bridge; while the men coming from the mine leave their lamps on the

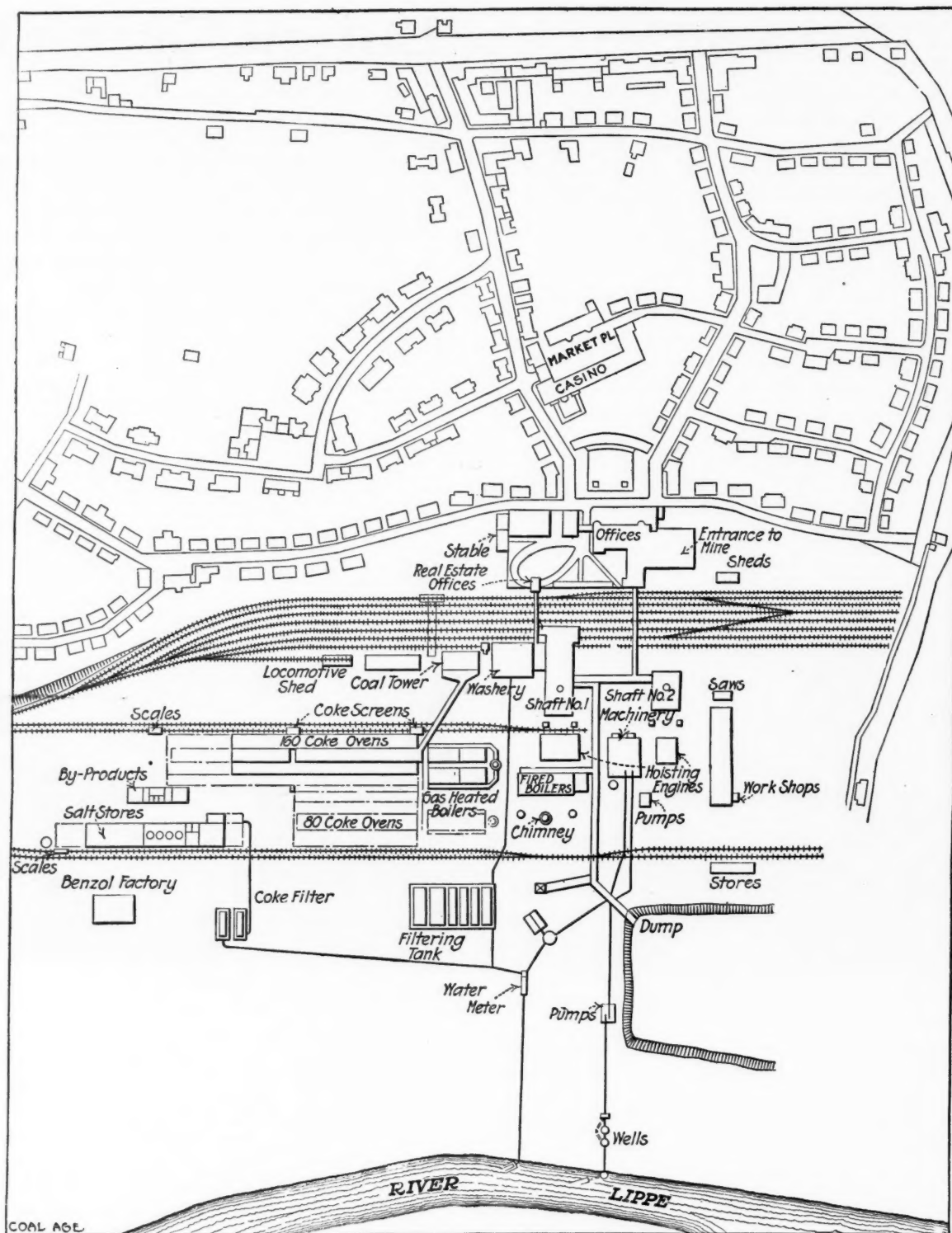


FIG. 2. LAYOUT OF COLLIERY PLANT AND WORKMEN'S VILLAGE

other side and have their own exit. There are also, Fig. 4, rooms for the medical service and first-aid work.

HOISTING PLANT

The shafts are 262 ft. apart and have a least diameter of 19½ ft. The air level is 1704 ft., the working level 2000 ft. No. 1, the main shaft, is provided with a double lift while shaft No. 2 is used for lowering timber and material chiefly and has but a single lift. The four floors of the cage in shaft No. 1 carry two cars each, so that eight cars are hauled at a time. The cars weigh 1030 lb. empty and carry 1675 lb. of coal. The hoisting engines are of

the twin-cylinder type, the exhaust being used in the steam turbines, as it is well known that it is the best economy to use the exhaust of hoisting engines for heating and for turbines. Electrical hoists were not considered on account of the greater first cost.

The leading dimensions of the three hoisting engines are the same—cylinder, 42 in. diameter by 71-in. stroke, with 30 to 40 r.p.m. The engines are designed for 175-lb. pressure at 482 deg. F. superheat, with a net load of 14,300 lb. and a maximum load of 20,000 lb. from a depth of 2500 ft., at 55 ft. a second, at 103-lb. pressure and 15-lb. back pressure. The screen contains three loading units,

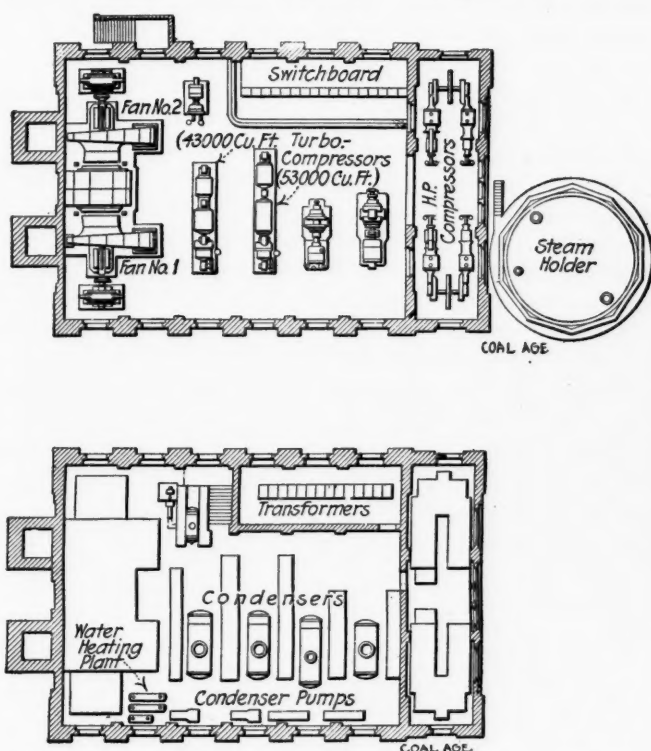
two for screening and loading lump coal, the third for loading the coal as it comes from the mine.

The washery has a normal output of 200 tons hourly and a maximum of 240 tons, and is electrically driven.

COKE AND BYPRODUCTS PLANT

There are two batteries of 80 ovens, and two of 40 ovens, with a plant for the production of tar, benzol and ammonium sulphate. The coke is pressed from the retorts by electrically driven machinery. The coking screen is arranged for 160 ovens.

The boilers are all single flue, alike in size, the working pressure being 175 lb. The battery of fired boilers consists of eleven boilers, with 105 sq.ft. heating surface each, internally fired. The gas-fired battery is made up of 19 boilers of a like capacity. The gases have a tem-



FIGS. 3 AND 4. SHOWING GENERAL ARRANGEMENT IN THE MAIN MACHINERY BUILDING

perature of 1900 deg. F. The boilers are all under cover, the arrangement being shown in Fig. 5. The width of the span is 98 ft., the side spans are 13 ft. each.

SUPERHEATERS

To lessen the condensation losses in the steam pipes, a superheating device is attached to each stoked boiler, which yields a temperature of about 500 deg. F.; the superheated steam has its own pipe system. The saturated steam from the gas-heated boilers is led to two superheaters, where it also is heated to 500 deg. F. The feed water is purified as well as preheated.

The main machinery hall is 77 ft. wide by 125 ft. long, and the general layout of its contents is shown in Figs. 3 and 4. It is provided with a 1000-kw. and a 328-kw. turbo-generator, the former for day and the latter for night service. The alternating current is used at 2000 volts and 50 cycles. The turbines make 3000 revolutions and are designed for 25 per cent. overload. The bearings are kept cool by the forced circulation of the refrigerated

lubricating oil, and the air used for cooling the generators is filtered.

There are two electrically driven fans, giving a maximum output of 350,000 cu.ft. per minute.

There are two turbo-compressors, one taking 43,000 and the other 53,000 cu.ft. per hour, which are driven by two-stage turbines and may be operated either by live steam or exhaust steam from the hoisting system, the latter being the regular working condition. The air is cooled to 176 deg. F. at 88 lb. pressure on leaving the compressors. All the exhaust steam is collected in a steam holder near the main machinery building.

There are two high-pressure air compressors, one being for reserve. The steam cylinders are 17 $\frac{3}{4}$ in. and 29 $\frac{1}{2}$ in. diameter by 19 $\frac{3}{4}$ stroke, and at 120 revolutions, each cylinder compresses 525 cu.ft. atmosphere to 2200 lb. pressure per minute, consuming about 275 hp.

Individual surface condensers are provided beneath each turbine, experience having shown that this gives the best vacuum, a most important feature in turbine



FIG. 5. A STREET IN THE VILLAGE

economy. The air and water pumps of the two turbo-compressors are driven by a high-pressure steam turbine exhausting into the large turbine. The pumps for the turbo-generators are electrically driven. All the water for condensation is driven from the river Lippe; but, before use, it is allowed to settle in large tanks.

HEATING PLANT

In the desire to keep the steam plants as compact and as concentrated as possible, a hot-water heating system was decided upon, thus doing away with all condensation losses, leaky stuffing-boxes and never ending repairs, as well as the noise from the steam hammer.

This system takes in the baths, workshops and offices. The water is heated by exhaust steam, three heaters in the basement of the machinery building having a heating surface of 475 sq.ft. and are of the brass water-tube type. The circulation pumps are electrically driven, the rotary pumps delivering 275 gal. a minute.

In planning the workmen's village, stress was laid upon making the walk to the mine a short one and upon creating pleasant attractive surroundings (see Fig. 2). There are 70 homes for officers and 637 houses for the men, generally of the several-family type. All are equipped with electric lights and each has its garden and shed. The streets are planted with trees and lighted by electric-

ity. On the main street is a market place, on the south side of which is the casino, with restaurant, music and card rooms. There is a school for very young children, where the little ones are cared for while their mothers are attending to their housework. There is also a school for sewing and cooking. Milk and mineral water find a large sale at the mine entrance.

Natural Gas Breaks Record

The production of natural gas in the United States in 1913 was the greatest in the history of the industry, surpassing that of any previous year in both quantity and value. The total gas production in 1913 is estimated by B. Hill, of the United States Geological Survey, at 581,898,239,000 cu.ft., valued at \$87,846,677, an average price of 15.10c. per thousand cubic feet, as compared with a production of 562,203,452,000 cu.ft., valued at \$84,563,957, an average price of 15.04c., in 1912, the increase being 19,794,787,000 cu.ft. in quantity and \$3,282,720 in value.

Of this total product, about 32 per cent. was utilized for domestic purposes, or 184,885,662,000 cu.ft., valued at \$50,522,415, an average price of 27.33c. per thousand cubic feet, and 68 per cent. was utilized for industrial purposes, or 397,012,577,000 cu.ft., valued at \$37,324,262, an average price of 9.4c. The industrial consumption in-

cludes gas used for both manufacturing and producing power.

West Virginia led in 1913 in quantity of natural gas produced, 245,453,985,000 cu.ft., valued at \$34,164,850 being the states output. Pennsylvania was second in quantity produced, with 118,860,260,000 cu.ft., valued at \$21,695,845. On the other hand, Pennsylvania was the leading state in 1913 in quantity of natural gas consumed, with 177,463,230,000 cu.ft., valued at \$28,709,565, and Ohio second with \$128,204,722,000 cu.ft., valued at \$27,055,824.

The extraction of gasoline from natural gas, or casing-head gas, from oil wells in the United States has become an industry of some importance in the last three years. Returns received from producers of gasoline of this character indicate that the production in 1913 amounted to 24,060,817 gal., valued at \$2,458,443, an average price of 10.22c. per gallon, as compared with a production of 12,081,179 gal., valued at \$1,157,476, in 1912, and 7,425,839 gal., valued at \$531,704, in 1911.

In 1913, West Virginia produced 7,662,493 gal. of natural-gas gasoline, valued at \$807,406; Oklahoma, 6,462,968 gal., valued at \$577,944; Pennsylvania, 3,680,096 gal., valued at \$405,186; California, 3,460,747 gal., valued at \$376,227; Ohio, 2,072,687 gal., valued at \$212,404. The balance of the 1913 output was produced by Illinois, Colorado, New York, Kentucky and Kansas.



TURNING OFF THE SUPPLY

The Haldane Flame Test for Black-damp

SPECIAL CORRESPONDENCE

SYNOPSIS—Effect of blackdamp noticeable in dimness of lights and rapid breathing. Blackdamp is not carbon dioxide, but a variable mixture of noxious gases. Depletion of oxygen proportional to amount of blackdamp present in air. Flame unsteady and easily extinguished as percentage of blackdamp increases. This fact is made the basis of the Haldane flame test for blackdamp. Description of apparatus used and manner of its calibration.

While the percentage of firedamp in mine air can be readily estimated by means of the cap on a lamp flame, no equally simple test has been hitherto available for estimating the amount of blackdamp in mine air. When their lamps burn dim or go out and their breathing becomes deeper and more rapid, these effects are attributed by miners to the presence of blackdamp in the air.

In chemical textbooks blackdamp is still treated as synonymous with carbon dioxide (CO_2), which mistake has led to much confusion. Pure carbon dioxide may be generated in a mine, and this gas is of frequent occurrence in some French coal mines, but no large amount of the gas has hitherto been found in any coal mine in this country.

Blackdamp, as ordinarily met with in mining, is simply nitrogen mixed with about 5 to 20 per cent. of carbon dioxide and some little oxygen may be present. It is the residual gas resulting from the various oxidation processes continually going on in mines and the surrounding strata. The oxygen is mostly consumed, leaving all the nitrogen and perhaps a little unconsumed oxygen; while the amount of carbon dioxide formed depends on the nature of the substance oxidized and other conditions. Thus, if iron pyrites (FeS_2) is oxidized no carbon dioxide is formed in the process, although the sulphuric acid formed may subsequently liberate more or less carbon dioxide from calcium carbonate (limestone). If, on the other hand, wood is oxidized, most of the oxygen consumed is converted directly into carbon dioxide.

It might perhaps be more logical to discard the use of the term "blackdamp" and refer only to the deficiency of oxygen and excess of carbon dioxide in mine air. To the miner, however, blackdamp has a very real meaning. Although the proportion of carbon dioxide in blackdamp varies within the limits mentioned, the character of the mixture is quite definitely described by its effect on both lights and men. There is therefore ample justification for retaining the name in mining practice.

When air is mixed with blackdamp, the oxygen percentage of the air is lowered in proportion to the amount of blackdamp added. The percentage of diminution of the oxygen is thus a measure of the percentage of blackdamp present; but firedamp or some other gas, if present in an appreciable amount, would, of course, help to lower the percentage of oxygen. In naked-light mines, however, firedamp is seldom present in appreciable quantities, so that the deficiency of oxygen is, practically speaking, a measure of the percentage of blackdamp in all such mines.

It is clear, then, that a suitable flame test could be graduated either to indicate the percentage of oxygen, or what seems simpler, to indicate the percentage of blackdamp present in the air of open-light mines. As the oxygen percentage in air diminishes, the flame of a candle or lamp is affected in two ways. In the first place, the light given steadily diminishes, being about 30 per cent. for a decrease of 1 per cent. in the oxygen; and the flame will no longer burn when the oxygen has fallen from normal (20.9 per cent.) to about 17.5 per cent. A further effect is that the flame becomes less and less stable as the percentage of oxygen diminishes, and is more easily blown out by any chance draught or movement. To those who work or move about in such air this effect is plainly evident, as their lights are constantly going out. It is upon these facts that the test I am about to describe is based.

When a thin lighted taper is held inside a glass tube an



THE HALDANE FLAME-TEST APPARATUS

upward draught is produced by the heated air column in the tube; and this varies in strength as the taper is held higher up or lower down in the tube. The draught tends naturally to blow the taper out and the flame is extinguished at a point lower down or higher up the tube, depending on the percentage of oxygen present. The tube chosen for this purpose is 7 in. long and 0.75 in. inner diameter. The principal graduations are in percentages of blackdamp from zero up to 10.5 per cent.; and there are, besides, corresponding subsidiary graduations in percentages of oxygen, reading from normal (20.9 per cent.) down to 18.8 per cent., at which point the taper ceases to burn in the tube; and when held upright it will no longer burn outside the tube with less than about 18.2 per cent. of oxygen or 13 per cent. of blackdamp. When the taper is held in a horizontal position, however,

it continues to burn until the percentage of oxygen has fallen to about 17.2 per cent., which corresponds to 18 per cent. of blackdamp. There is thus a wide range through which the proportion of blackdamp can be estimated by the taper and tube.

The tube and tapers used in these experiments, which demonstrate the Haldane flame test, are shown in the accompanying figure; and the following tables are interesting. Table 1 shows the results of experiments made in a closed chamber, with the object of finally testing the graduation of the tube. No vitiation of the air was caused by breathing, but only by the combustion of the tapers used in the test. While each test was being made air was breathed from the outside through a tube, until after a sample had been taken for analysis. The air was thoroughly mixed by a fan before each test and the percentage of moisture was kept at about 2 per cent. The taper, held vertically, was extinguished when the oxygen fell to 18.2 per cent.

TABLE 1. RESULTS OF EXPERIMENTS MADE IN CLOSED CHAMBER

Percentage of Oxygen Found by Tube	Percentage of Oxygen Found by Analysis	Percentage of Carbon Dioxide	Percentage of Black Damp Indicated by Tube	Percentage of Black Damp Found by Analysis
20.90	20.90	0.56	0	0.1
20.45	20.33	0.49	2 1/4	2.9
20.15	20.13	0.65	3 3/4	3.8
20.00	20.67	0.71	4 1/2	4.1
19.65	19.63	1.07	6 1/4	6.2
19.25	19.32	1.33	8	7.7

As shown by Table 2, however, the same accuracy cannot be expected in tests made underground, unless troublesome corrections are introduced for the varying percentages of moisture in the mine air and the varying proportion of carbon dioxide in the blackdamp mixture; and unless great care is taken to observe the exact point at which the flame is extinguished.

TABLE 2. TESTS MADE UNDERGROUND

20.9	20.78	0.16	0	0.7
19.7	19.73	1.02	6	5.9
18.9	19.20	1.51	9 1/2	7.9
19.5	19.65	1.06	7	6.1
20.7	20.77		1	0.8
20.5	20.73	0.12	2	1.0

It will be seen that in every case but one the indication of the tube was correct to within about 0.2 per cent. of oxygen or 1 per cent. of blackdamp. These experiments indicate, however, that this method is sufficiently delicate to make it very useful in estimating the percentage of oxygen or blackdamp in the mine air. For ordinary practical purposes, it is greatly preferable to a chemical analysis, as it gives the information at once and the test can be reported in as many places as desirable.

The tube method must not, however, be supposed to do more than it actually accomplishes. For instance, it does not detect carbon monoxide in air containing afterdamp or fumes from explosives or an underground fire, which might be excessively dangerous although the tube test would not show it; but, nevertheless, the tube is a more practical means of testing for blackdamp than a lamp.

Commutating Poles for Mine Locomotive Motors

By J. C. BARRY*

SYNOPSIS—This is a clear and concise statement of the factors governing motor design and performance; also the reasons for and effect of commuting poles upon the magnetic field of the machine and upon the commutation.

The May 9 issue of COAL AGE contained an article entitled, "Interpole Motors for Mining Locomotives," which generally depreciates the desirability of employing this type of motor for mining work. The paper contains certain contradictory statements, in which the point of view seems to have been changed at will to suit the argument at hand.

For instance, at the beginning it intimates that the initiative in the application of commuting poles to mine-locomotive motors was taken by certain manufacturers, principally for the purpose of reducing cost, but later it states that there is no particular difference in the cost of production between the commuting-pole and the non-commuting-pole motor.

It further maintains that the commuting-pole motor should not be recommended for mine locomotives on account of greater complication and because there is no gain in efficiency, although there are no facts advanced to substantiate the latter statement.

Although the statement regarding cost is questionable, it would seem, if true, an argument in favor of the com-

mutating-pole motor; as it is both legitimate and commendable to reduce the production cost of any commodity without depreciation of quality and with ultimate benefit to the purchaser.

Were it not for the fact that the article referred to attempts to show that the commuting-pole motor as applied to mine locomotives has no advantage over the non-commuting-pole machine, the whole subject might be dismissed without further comment. It is the purpose of this paper, however, to show that the introduction of commuting motors for mine haulage is as legitimate and important as their application to railway traction work, where they have entirely superseded the noncommuting-pole type. To prove this statement, it will be necessary to go into the designs of the two types of motors quite thoroughly, considering the losses involved, their effect on performance and to what extent they can be controlled in the design of the motor.

MOTOR LOSSES

In any direct-current electrical motor, the losses can be divided under three heads. The C^2R , or *copper loss*, is due to the resistance of the conductors on the armature and field windings. This loss varies with the square of the current, as will be seen from the formula $C^2R =$ watts lost.

The copper loss is composed principally of two parts, one due to the load or line current and the other due to the idle current that circulates in the short-circuited

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turns of the armature winding at the instant of commutation, due to the distortion of the field by the armature reaction.

The core loss can be separated into two parts. One is known as the eddy-current loss and is due to the current set up in the armature laminations by their being revolved in a magnetic field. This loss increases with the square of the number of magnetic lines per square inch, or the density of the field, and with the square of the speed.

The other part, known as the hysteresis loss, is due to the reversals of the magnetic lines of force in the armature iron, as it is being revolved in the magnetic field, which varies with the 1.6 power of the density and directly with the speed. These two losses combined are known as the core loss.

FRICTION LOSS

The third loss is the mechanical, or friction, loss, and is due to the bearing friction, the brush friction on the commutator and the windage.

This friction loss amounts to about 1 per cent. at full load of the energy being supplied to the motor; and, as it is practically equal on all types of machines, it can be eliminated from the discussion.

The combined core and copper losses in a well designed motor will amount to about 12 to 14 per cent. of the input at full load, and about 8 to 10 per cent. of the input at one-half load. At full load, this loss is largely composed of the C²R or copper loss, but at one-half load it is principally the core loss.

From this, it will be seen that the copper loss is the greatest loss at full load, and the one largely responsible for the one-hour rating of the motor. On the other hand, it will be noted that for loads of one-half or less, the core loss is the principal loss and, therefore, largely responsible for the continuous rating of the motor.

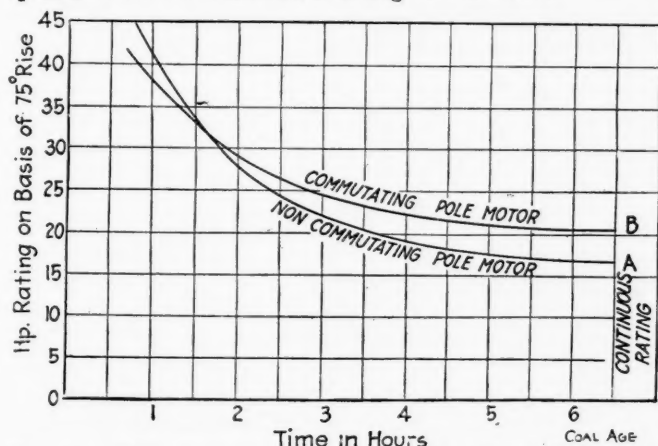


FIG. 1. HORSEPOWER CURVES FOR THE TWO TYPES OF MOTORS

The copper loss of the motor is well within the power of the engineer to control. He, therefore, can govern fairly well the hourly rating that the motor is to have. The core loss of a *noncommutating-pole* motor is not so well within the control of the engineer, because he must sacrifice low core loss in order to get good commutation, and in so doing, sacrifice the continuous rating of the machine.

NONCOMMUTATING-POLE VERSUS COMMUTATING-POLE DESIGN

In the design of any direct-current motor, the question of commutation must be kept firmly in mind; for no mat-

ter how good the other characteristics of the machine may be, if it does not possess the ability to commute, it must be considered a failure.

In the design of any motor, there are two forces that must not be lost sight of: one of these is the magnetic field produced by the current in the field windings; the other, the magnetic field produced by the current in the armature winding.

These two fields are directly opposed to each other. The former is known as the motor field and the latter as the armature reaction. If the motor field is not sufficiently strong, it will be overpowered and distorted by the armature reaction to such an extent as to cause injurious sparking at the brushes.

This sparking is caused by the armature reaction

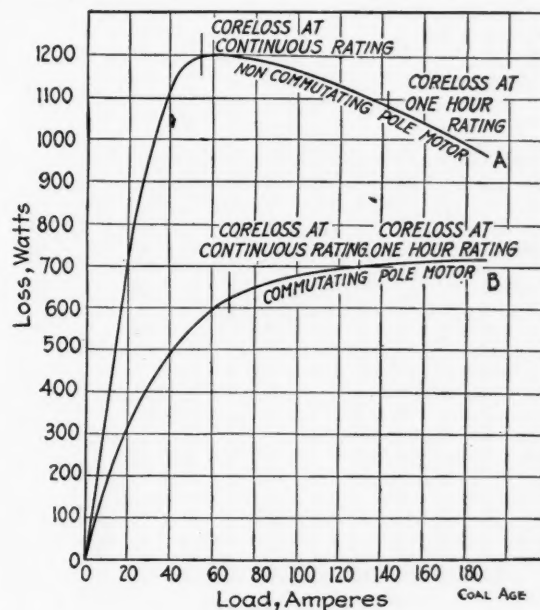


FIG. 2. CORE-LOSS CURVES OF THE TWO TYPES OF MOTORS

crowding the field flux backward, against rotation, to such an extent as to force the armature coils under the brushes to cut a magnetic field and thereby produce a difference of potential between the commutator bars under the brushes, causing a heavy current to flow in these coils, heating the armature and causing sparking and burning at the brushes.

In order to overcome this difficulty, the designer of a *noncommutating-pole* motor must increase his motor field or magnetic density to a high point, so that the effect of the armature reaction will not greatly distort it. In this way he can effect fairly good commutation and greatly reduce the circulating current and consequently the heating in the short-circuited coils of the armature undergoing commutation. But by doing this, he greatly increases the core loss; for it will be remembered that the core loss increases practically as the square of the magnetic density, or with the square of the strength of the field.

THE DESIGN IS A COMPROMISE

It will be seen, therefore, that the design of a *noncommutating-pole* motor of this type is one of compromise. If the designer attempts to run low magnetic density, in order to reduce his core loss, he is sure to get into trouble from commutation, caused by the distortion

of the field by the armature reaction. On the other hand, if he increases the density to prevent this, the core loss will be excessive.

This condition is fully realized; for he knows that the core loss does not greatly affect the hourly rating of the machine, which, unfortunately, is the standard by which all mine-locomotive motors are compared, and also that the core loss will not readily be detected by the operator. He, therefore, disregards core loss and pushes the magnetic density to the limit in his endeavor to secure good commutation, regardless of the heating characteristics of the motor on continuous service.

In the design of the commutating-pole motor, the problem is different. The designer is no longer compelled to rely on high magnetic densities to prevent the distortion of the field by the armature reaction, but makes use of the commutating pole.

This auxiliary pole is magnetized so that it directly

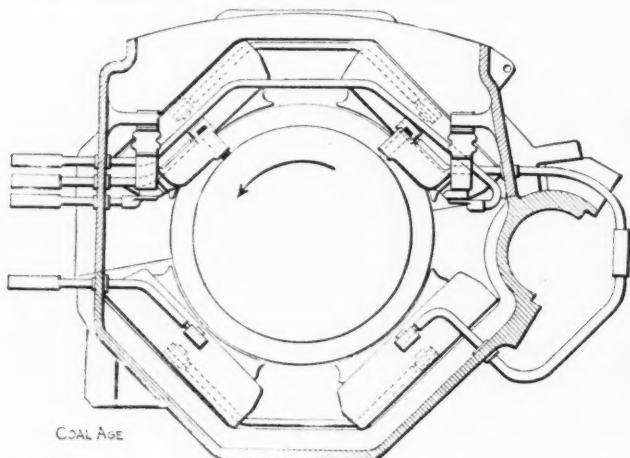


FIG. 3. CONNECTIONS FOR A NONCOMMUTATING-POLE MOTOR

opposes and practically neutralizes the armature reaction in the commutating zone. The motor field is, therefore, mostly relieved of the distorting effect of the armature turns or armature reaction.

By this means the engineer is able to run low densities in his armature core, armature teeth and pole faces, greatly reducing the core loss and consequently the heating, which results in an increased continuous rating of the motor.

The commutating pole, therefore, minimizes the distortion of the field by the armature reaction, fixes the brush position for all loads with either direction of rotation, prevents all sparking and burning at the brushes, and reduces local current in the armature winding to a minimum.

In order to prove these theories and substantiate the above statements, the horsepower time curves and core loss curves of two motors of practically the same one-hour rating are submitted. These curves are the result of actual tests conducted by the writer on these two types of motors. The mechanical features of the two machines are as follows:

	Noncommutating Pole Motor	Commutating Pole Motor
Weight	2130 lb.	1850 lb.
Speed	375 r.p.m.	395 r.p.m.
Mount on	28-in. wheels	28-in. wheels
Mount on	30-in. gage	28-in. gage
Builder's rating ..	40 hp.	37½ hp.

Figs. 1 and 2 show the horsepower time and core-loss

curves of the two motors on the standard basis of a 75-deg. C. rise.

Curve *A* represents the noncommutating-pole motor and curve *B* the commutating-pole machine. By referring to curve *A*, it will be seen that the noncommutating-pole motor has an hourly rating of 41 hp., and a continuous rating of 16½ hp., or 40.2 per cent. of its one-hour rating for a continuous rating.

Referring to curve *B*, it will be seen that the commutating-pole motor has a one-hour rating of 38 hp. and a continuous rating of 20.8 hp., or 54.8 per cent. of its one-hour rating for a continuous rating.

If the noncommutating-pole motor had been designed with interpoles, along the lines of the commutating-pole machine herein described, it would have 54.8 per cent. of its one-hour rating, or 22.6 hp. for its continuous rating instead of its present rating of 16½ hp., an increase of 6.1 hp., or 36.4 per cent. in continuous rating.

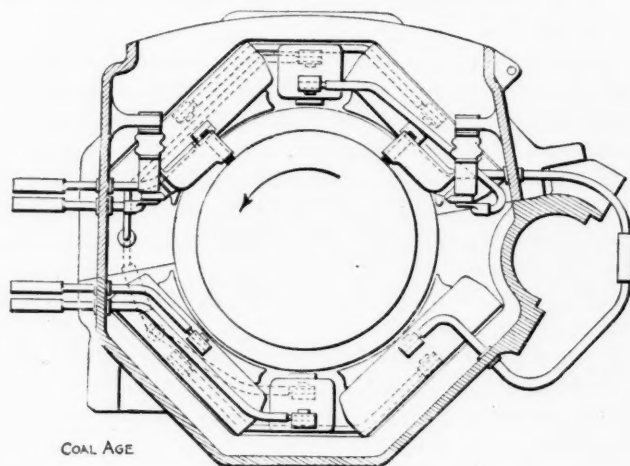


FIG. 4. CONNECTIONS FOR A MOTOR WITH TWO COMMUTATING POLES

It would be pertinent to inquire if this gain of 36.4 per cent. in the continuous capacity of a motor is not of sufficient importance to compensate for the slightly more elaborate field connections of the commutating-pole type.

CONNECTIONS

I would also like to point out that the connections of a commutating-pole motor of the type used in mine locomotives are not so complicated as the writer of the article referred to would have us believe. In the first place, a sketch is shown of a commutating-pole motor with four main and four commutating poles. The leading manufacturers who have adopted this type of construction for mine locomotives as standard, use one-half as many commutating poles as main poles. Therefore, in the conventional four-pole motor, there would be employed two commutating poles instead of four.

The accompanying sketches will give the exact relation between the two types of motors in regard to connections, as actually constructed.

CONCLUSION

It will be seen, therefore, that commutating-pole motors have been introduced into mine haulage for the same legitimate reason that they have been adopted in railway traction work, namely, higher efficiency, improved commutation, reduced core loss and increased continuous capacity.

The Plant of the Lilley Coal & Coke Company

By LEE LLEWELLYN*

SYNOPSIS—This plant is arranged to load coal upon either railroad cars or river barges. No hand tramming is necessary from the time a trip of loads is uncoupled from the locomotive at the foot of the slope until the cars are again made into trips of empties for return to the workings.

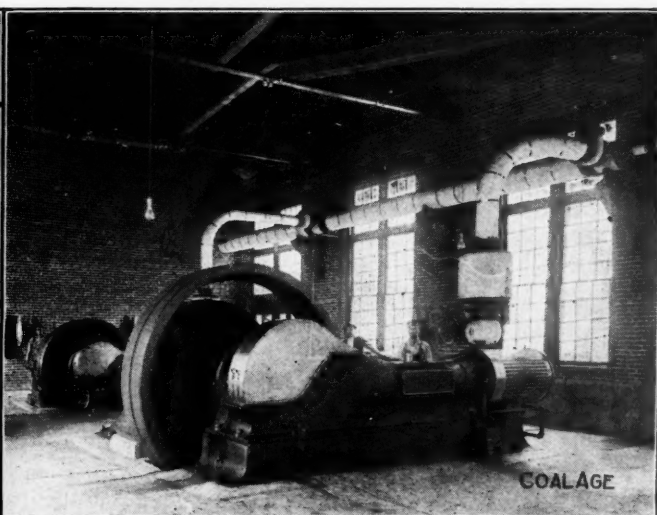
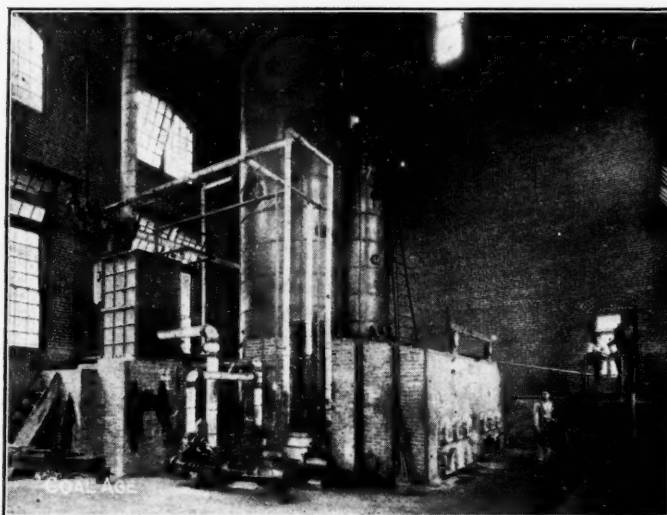
On the Monongahela River, about one mile from West Brownsville, Penn., and provided with a connection to the Pennsylvania R.R., is located the plant of the Lilley Coal & Coke Co.

The officers of this firm are Thomas Lilley, president, John Moffit, secretary and treasurer, and Thomas Elliott,

250-275-volt compound-wound Westinghouse generators, driven by Harrisburg engines. Provision has been made for the future installation of two more 300-hp. boilers, and an additional 300-kw. generator, also for a boiler coal-handling plant.

The present fan, a 6-ft. Venturi, driven by a 25-hp. General Electric motor, is a temporary installation. An air shaft is now being sunk, at which a permanent ventilating fan will be installed, the make of which has not yet been decided upon.

Mine haulage is accomplished by means of Baldwin-Westinghouse locomotives, equipped with cable and crab reels. The cutting machines are of the chain type and



VIEWS IN THE BOILER HOUSE AND ENGINE ROOM

assistant treasurer and superintendent. The engineers are Harrop, Hopkins & Taylor, of Pittsburgh, who were in charge of the construction of the plant.

The company owns 800 acres of coal and 400 acres of surface upon which the plant and town are built. The coal measure operated is the famous Pittsburgh seam, which is here 9 ft. thick, and reached by means of slopes. This particular block of coal is one of the finest on the Monongahela River.

Two slopes have been driven to the coal bed, one being employed for hoisting and the other as a supply and manway. Both are concrete lined and well lighted with incandescent lamps.

The power plant is housed in a building 40x132 ft. in dimensions with a partition separating the boiler room from the engine room. This is of brick construction with concrete floors. Two 300-hp. Wickes vertical boilers equipped with Murphy stokers, two American boiler-feed pumps and a Cochrane feed-water heater of 2000 hp. capacity make up the steam-generating equipment and auxiliaries. Steam is regularly carried at 150 lb. gage pressure.

The engine room contains one 300-kw. and one 150-kw.

*Pittsburgh Coal Washer Co., Fulton Bldg., Pittsburgh, Penn.

were manufactured by the Goodman Electric Co., and the Jeffrey Mfg. Co.

The power plant, tipple and car hauls were built under contract by the Pittsburgh Coal Washer Co., Fulton Bldg., Pittsburgh, Penn. This firm constructed and equipped the power plant, and designed and equipped the tipple. The Pittsburgh Bridge & Iron Works, however, fabricated and erected the structural steel from plans furnished by the Pittsburgh Coal Washer Co. The Dravo Contracting Co., of Pittsburgh, built the river piers and tipple foundations under contract.

TIPPLE OPERATION

The operation of the tipple and head works is as follows:

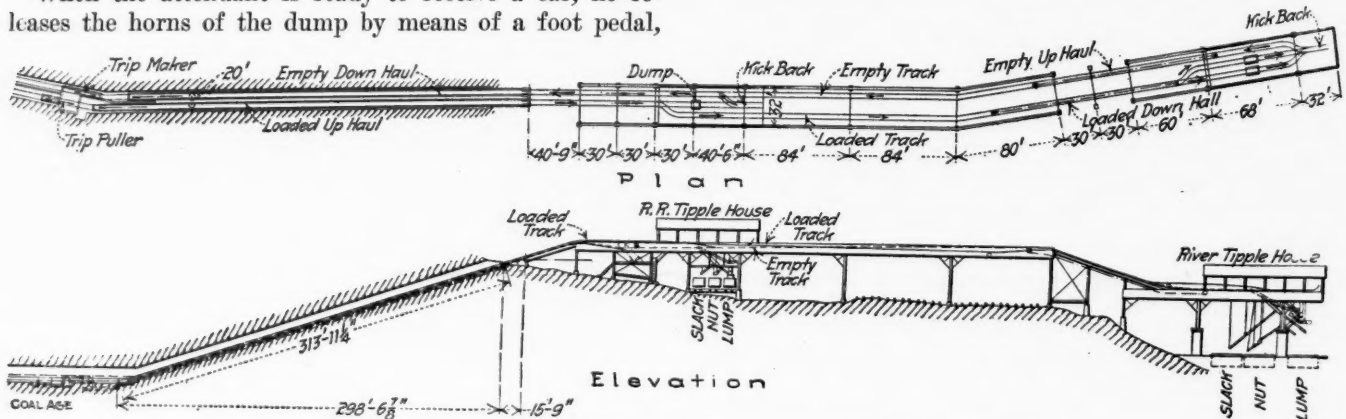
Loaded cars in trips of 80 or less are delivered by the mine locomotive to the trip puller, located at the foot of the slope. This device, picks up the trip, and delivers the cars one at a time to the up-haul chain of the car haul. This car haul consists of two parts, an up-haul chain for loaded cars and a down-haul for empty ones. It operates in a slope approximately 350 ft. long on a grade of 32½ per cent.

The up-haul delivers the loads spaced 24 ft. apart at the rate of 3½ cars per minute at a point 40 ft. beyond

the knuckle from whence they gravitate to a special car-feed regulator and are brought to rest about 20 ft. in rear of the horns of a Phillips cross-over dump.

When the attendant is ready to receive a car, he releases the horns of the dump by means of a foot pedal,

The down-haul chain picks up the loaded car, delivers it to a point approximately 85 ft. in rear of the horns of two Phillips cross-over dumps, from which point it gravi-



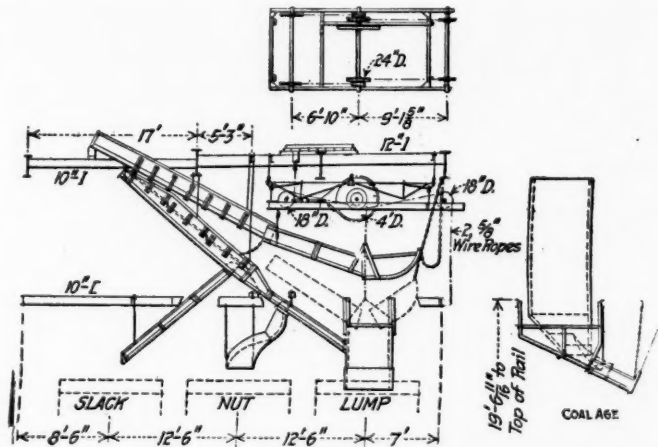
PLAN AND ELEVATION OF THE RAILROAD AND RIVER TIPPES

and the car gravitates to the dump where the coal is discharged onto a set of gravity screens. The empty car passes over the dump, through a kick-back, from whence it gravitates to the head of the down-haul chain, by which it is lowered back down the slope.

From the foot of the down-haul chain the empty cars gravitate a distance of about 45 ft. to a trip maker, which picks them up and passes them on down the heading on a one-half per cent. favoring grade until a trip of 80 cars or less has been formed.

If it is desired to pass any or all of the coal through the river tipple, a switch at the end of the up-haul is thrown, and the cars allowed to pass to a second loaded track, which leads to the river tipple.

In this case the car gravitates from the above mentioned switch to the end of a chain car haul. This car haul consists of a down-haul for loads and an up-haul for empties, and is used for lowering the loads from the level of the railroad tipple to that of the river tipple, and bringing the empties back up again. The head end of the down haul is built on an up-grade of sufficient length to bring the cars to rest after they have gravitated from the main haul, and a special car check is provided to prevent them from running backward.



SCREENING PLANT AT RAILROAD TIPPLE

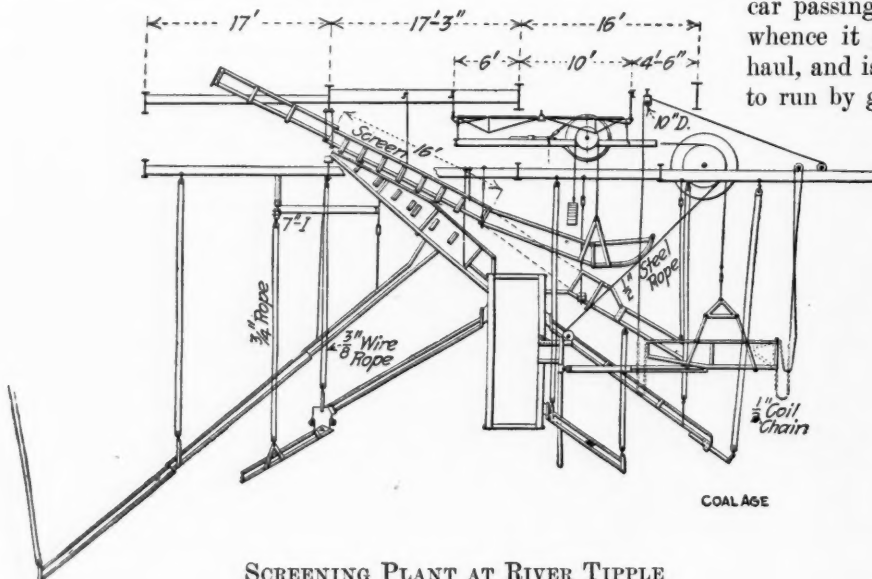
tates to either of the two special car-feed regulators, located about 20 ft. in rear of the dump horns.

GRAVITY SCREENS ARE EMPLOYED

The operation of the car regulator is the same as the one described for the railroad tipple. The coal is discharged into one of two sets of gravity screens, the empty car passing on over the dump to a kick-back, from whence it gravitates to the foot of the empty up-haul, and is elevated to a sufficient height to allow it to run by gravity to the main down-haul chain and return to the mine.

The trip puller above mentioned, located at the foot of the slope, is about 20 ft. long from center to center of the sprockets, and capable of handling a trip of 80 loads on a level grade at the rate of $3\frac{1}{2}$ cars per minute, the total gross weight of each car being about 7500 lb.

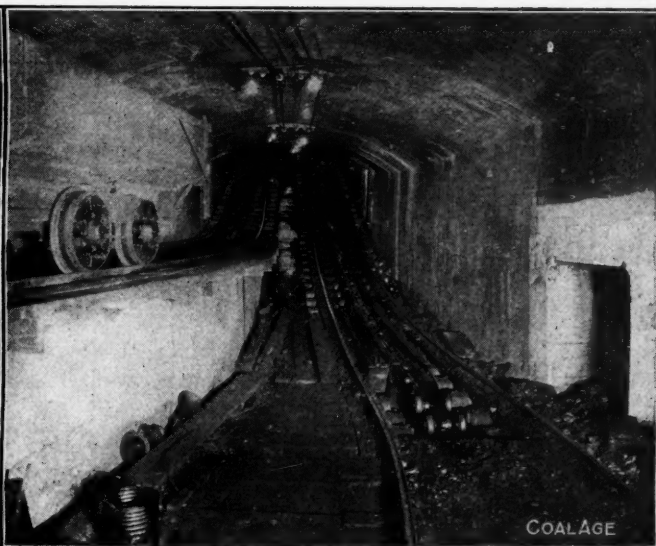
The chain is composed of 12-in. pitch links, made up of $2\frac{1}{2} \times \frac{5}{8}$ -in. bars, connected by $1\frac{1}{4}$ -in. diameter pins, which are turned down at the ends and riveted over steel washers $\frac{1}{8}$ in. in thickness. Steel knock-down dogs are inserted in the chain



SCREENING PLANT AT RIVER TIPPLE



THE DRIVING MACHINERY FOR MAIN CAR HAUL, LOCATED UNDER TIPPLE FLOOR



VIEW AT FOOT OF SLOPE, SHOWING UP-HAUL AND DOWN-HAUL CHAINS

every 10 ft. to engage attachments on the bottoms of the cars.

The trip puller is driven by a 25-hp. motor, which also drives the trip maker. The drive is accomplished through a rubber belt and two spur-gear reductions. The head shaft is 5½ in. in diameter and the tail shaft 3 in., the latter being equipped with extra-heavy take-up bearings. The speed of travel is approximately 35 ft. per minute, and a friction clutch is provided for controlling the operation of the device.

The trip maker is about 15 ft. from center to center of the sprockets and is capable of handling empty cars at the rate of 3½ per minute and forming them into trips of 80 or less, on a ½ per cent. favorable grade, the weight of each empty car being approximately 2500 lb.

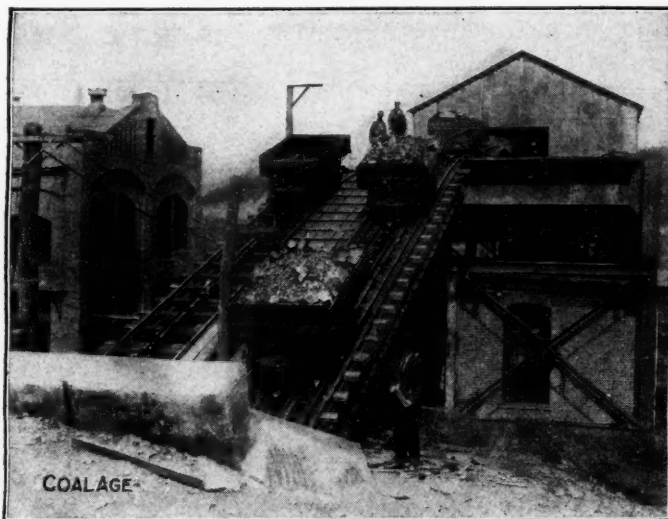
The 12-in. pitch steel chain is made up of 2½x5⅝-in. bars, connected by pins 1¼ in. in diameter, being a duplicate of the trip-puller chain. Steel knock-down dogs are inserted every 5 ft., these engaging an attachment on the bottom of the car. The trip maker is driven from the trip puller's countershaft through a spur-gear reduction and a steel-thimble roller-chain transmission. The head

and tail shafts are 4½ in. and 2½ in. in diameter, respectively, and the latter is equipped with an extra-heavy take-up bearing. The lineal speed is about 40 ft. per minute.

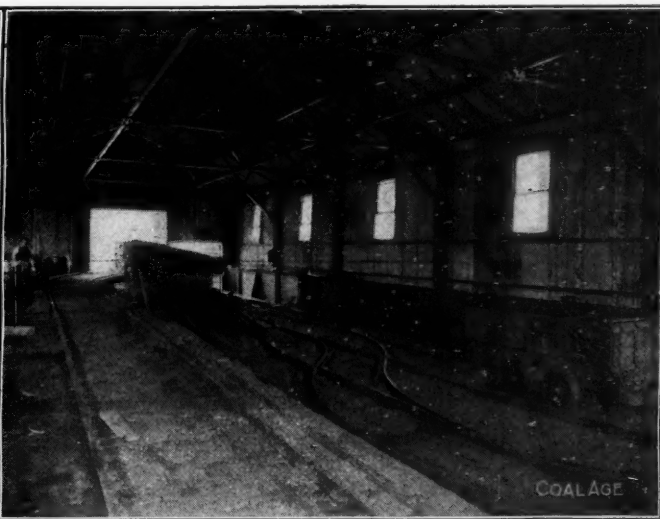
THE UP-HAUL IS OF EXTREME LENGTH

The up-haul is approximately 500 ft. from center to center of sprockets, measured along the grade with the inclined portion on an 18-deg. slope for a distance of approximately 400 ft. It was designed to handle loaded mine cars weighing 7500 lb. each, at the rate of 3½ per minute.

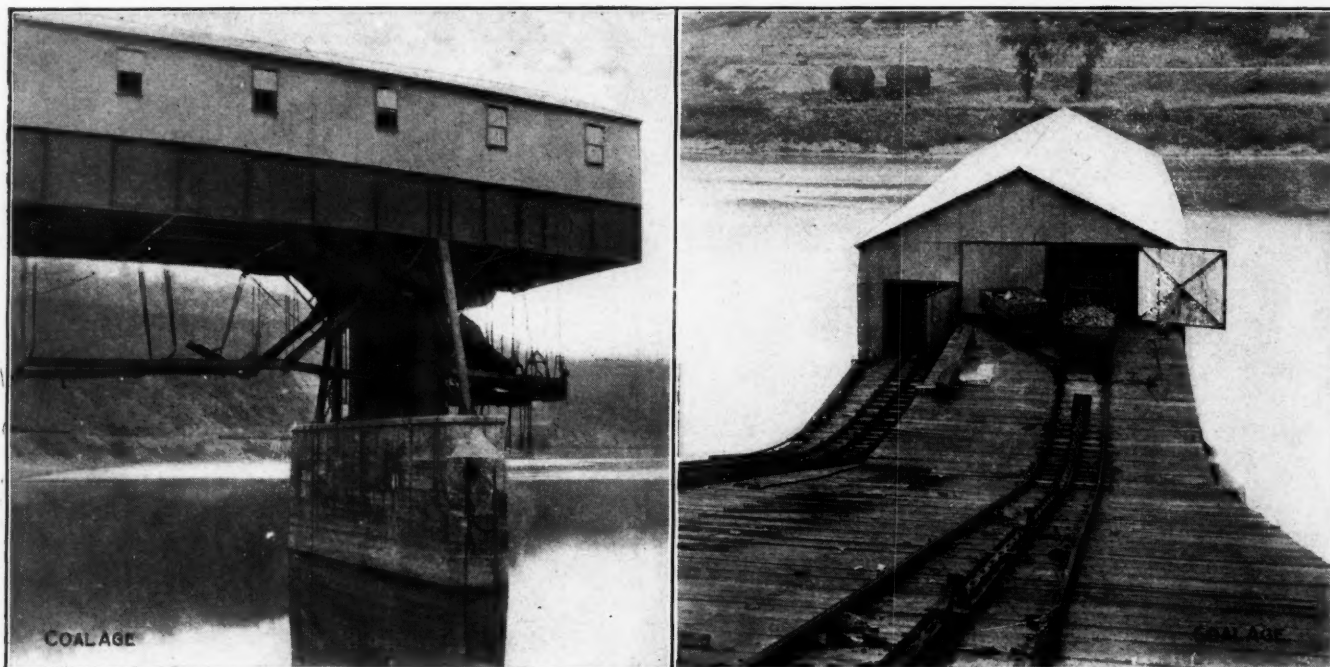
The chain is made up of steel links with a pitch of 18 in., composed of 5x1½- and 5x3-in. bars, set two and one and connected by steel pins 2½ in. in diameter. Forged-steel hook links are inserted in the chain every 24 ft. for engaging the attachments on the cars. Each hook link is carried by four cast-iron, steel-bushed traction wheels with chilled faces, these being 6 in. in diameter. The chain between each set of hook links is carried on two of the same wheels. The pins of the chain are extended to form axles for these wheels, both ends being turned



ANOTHER VIEW OF THE CAR HAULS



A VIEW OF ONE OF THE DUMPS



GENERAL VIEW OF AND APPROACH TO THE RIVER TIPPLE

down to $1\frac{1}{2}$ in. in diameter to accommodate hexagon nuts. Steel washers $\frac{1}{4}$ in. thick are inserted between each nut and wheel, while the nut is held in place by a $\frac{3}{8}$ -in. cotter pin extending through the axle. Intermediate pins are turned down at the ends and riveted over $\frac{1}{4}$ -in. steel washers.

The up-haul is provided with 8 knuckle rollers 18 in. in diameter to relieve the carriers of the strain at the knuckle points. These rollers are mounted on cold-rolled steel shafts, $2\frac{1}{2}$ in. in diameter, supported in cast-iron flanged babbitted deadeyes, bolted to special structural-steel girders.

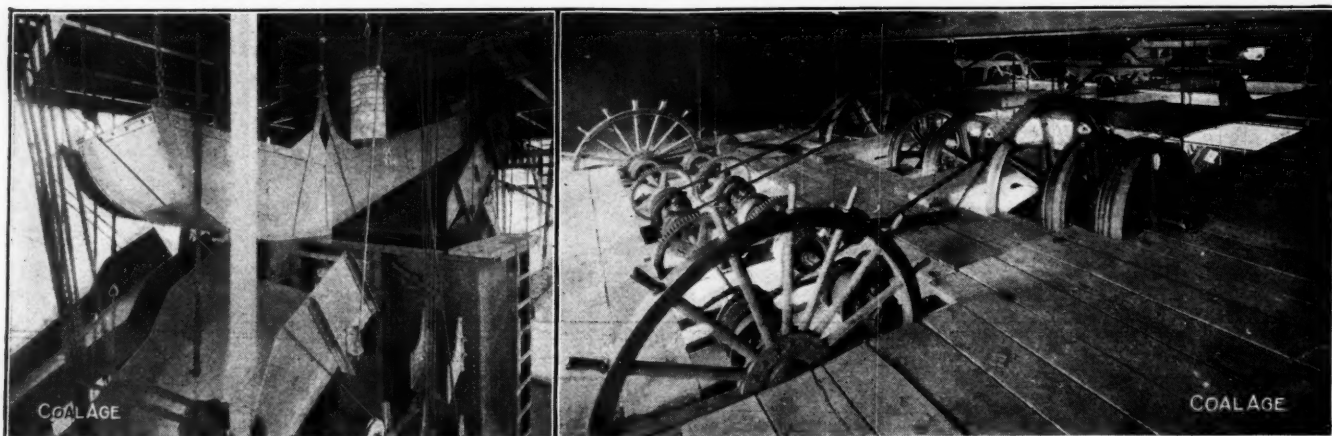
The chain is carried forward to a knuckle shaft approximately 55 ft. in rear of the railroad tippie dump and brought down beneath the floor to the head sprocket and shaft, to which the driving machinery is attached. This keeps the machinery entirely below the floor and out of the way.

This haul is driven by a 200-hp. steam engine through a rubber belt and two spur-gear reductions. The speed of the chain is 84 ft. per minute, and the capacity $3\frac{1}{2}$ cars. The calculated horsepower is 133 when the up-haul

is loaded and the down-haul empty. When both the up-haul and down-haul are loaded, the calculated horsepower is 105. The estimated maximum stress on the chain is 45,000 lb., but the bearing load on the pins and links is only 6000 lb. per sq.in. of projected area. The links also at the weakest section are stressed to only 6000 lb. per sq.in. in tension. This provides for an ample factor of safety, insuring a long life to the chain.

The head shaft is $9\frac{1}{2}$ in. in diameter of hammered steel, while the tail shaft is 4 in. in diameter and of cold-rolled steel. The knuckle-sprocket shafts are 6 in. in diameter of cold-rolled steel. The first and second counter-shafts are 4 in. and 3 in. in diameter, respectively, both of cold-rolled steel, while the tail shaft is equipped with extra-heavy take-up bearings, having an adjustment of 24 in.

The head, tail and knuckle sprockets are $58\frac{1}{2}$ in. in pitch diameter of a special car-wheel iron. The pinion on the first set of gears is cut forged steel, 10.4 in. in pitch diameter, carrying 13 teeth, $7\frac{1}{2}$ -in. face. The gear with which this pinion meshes is cut cast iron, 72 in. in diameter, 90 teeth, 7-in. face. The pinion of the second



SCREEN RIG AT RIVER TIPPLE AND OPERATING RIG FOR THE SAME

gear reduction is machine-molded cast steel, double shrouded. It is 14.62 in. in pitch diameter, has 13 teeth of 11-in. face. The gear with which it meshes is machine molded, is 95.83 in. pitch diameter, carries 86 teeth of 10½-in. face. These gears are 3½-in. pitch.

The head shaft on the haul is provided with a 6-ft. ratchet wheel to prevent the chain from backing. This wheel is cast steel and has a double forged-steel noiseless pawl.

RIGID SUPPORTS ARE PROVIDED

The driving machinery is mounted on rigid structural-steel supports. The upper chain guides consist of two 4x3x¾-in. angle irons, mounted to wood ties. The lower chain guides consist of two, 2x¾-in. steel bars, secured to wooden stringers. The return strand of the chain runs in a concrete-lined trench.

This up-haul chain is perhaps the largest ever installed. The entire haul is practically noiseless and has worked perfectly from the time it was first started, it being entirely unnecessary to make even a single adjustment. This is a remarkable record, considering the size of the installation.

The down-haul is approximately 460 ft. long from center to center of the sprockets, measured along the slope. The inclined portion is on an 18-deg. angle for a distance of approximately 390 ft. It was designed to handle empty cars weighing 2500 lb. at the rate of four per minute.

The chain is of 12-in. pitch, made up of 3x⅝-in. steel bars, set two and two, and connected by steel pins 1½ in. in diameter. These are turned down at the ends and riveted over steel washers ⅜ in. thick. Cast-steel knockdown dogs and special disappearing dogs made of cast steel are inserted in this chain every 10 ft.

When the empty car returns to the head end of the haul, it comes to rest on the incline in front of the knuckle, and is held in position by special car checks. A knockdown dog picks up the car and carries it up the incline to the knuckle, where it runs forward about 8 ft. to one of the disappearing dogs, which, in the meantime, has come up to position for its reception. The car is then lowered by this dog to the foot of the slope.

The chain is carried forward to a knuckle sprocket, then brought down underneath the floor to the head sprocket, which is driven from the head shaft of the up-haul through a spur-gear transmission. The speed of the haul is 80 ft. per minute.

STRESSES AND PRESSURES ARE SMALL

The calculated maximum stress in this chain is 11,200 lb., and the bearing load on the chain pins is only 6000 lb. per sq.in. of projected area. The chain links at the weakest section are stressed only to 6000 lb. per sq.in. in tension.

The head, knuckle and tail shafts are 6 in., 4½ in. and 3 in. in diameter, respectively, all being made of cold-rolled steel. The tail shaft is equipped with extra-heavy take-up bearings, having an adjustment of 18 in.

The upper chain consists of steel channel irons bolted to wood ties. The lower guides are made up of two 2x¾-in. steel bars, secured to wood stringers. The return strand of the chain runs in a concrete-lined trench.

The down-haul for loaded cars at the river tippie is approximately 142 ft. from center to center of the sprockets, measured along the haul, with the inclined portion on

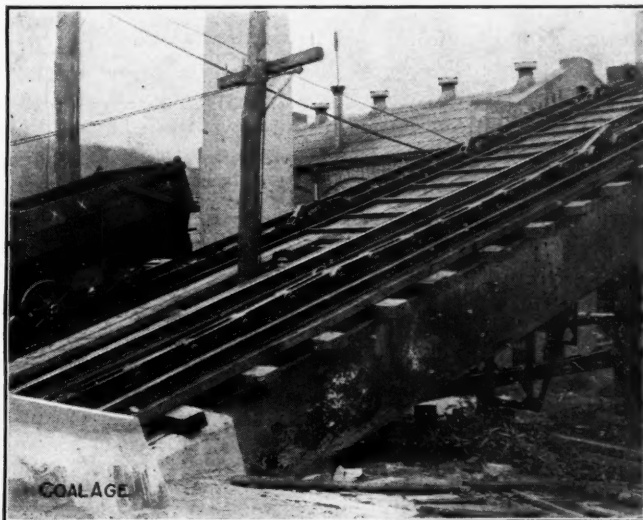
an 18-deg. slope for a distance of approximately 80 ft. It was designed to lower the loaded cars from the level of the railroad tippie to that of the river tippie at the rate of four per minute.

The chain is of 12-in. pitch, and is made up of bars 2½x⅝ in., set two and two, and connected by 1¼-in. steel pins, which are turned down at the ends and riveted over steel washers ⅛ in. thick. The links and pins are duplicates of those employed in the trip-puller and trip-maker chains. Cast-steel knockdown dogs, and special disappearing dogs, of the same material, are inserted in the chain every 10 ft.

The loaded cars coming from the railroad tippie gravitate to a point in front of the knuckle, being there held in position by special car checks until a knockdown dog delivers each individual car to the disappearing dog, which in turn discharges it at the foot of the slope, from whence it runs by gravity to either one of the cross-over dumps.

POWER MUST SOMETIMES BE ABSORBED

The motive power for this haul is a 25-hp. motor, which also drives the empty up-haul through a belt and two spur-gear reductions. This drive is connected up to the head shaft of the empty haul. When the two hauls are working under ordinary conditions, it requires 3 hp. to drive them. When all portions of both hauls are loaded, except the slope of the down-haul for the loaded cars, 19



THE UP-HAUL AND DOWN-HAUL CHAINS AT THE SLOPE PORTAL

hp. is required momentarily. When only the down-haul slope is loaded, about 8 hp. has to be dissipated. This is accomplished by connecting the driving motor with a suitable control in such a manner as to take power from the line only when it is required for the operation of the hauls and to absorb power, automatically becoming a generator and discharging surplus power to the line when the hauls are so loaded as to drive the motor. A shunt brake is provided to hold the load when the current is off.

The speed of this haul is 60 ft. per minute and the capacity four cars. The head and tail shafts are 5 in. and 3 in. in diameter, respectively, both being of cold-rolled steel. The tail shaft is equipped with extra-heavy take-up bearings, having an adjustment of 15 in.

The up-haul for the empty cars at the river tippie is approximately 142 ft. from center to center of the sprock-

ets, measured along the chain with the inclined portion at an angle of 18°, for a distance of 100 ft. This was designed to lift the empty cars from the river-tipple level to that of the railroad tipple at the rate of four per minute.

The 12-in. pitch chain is made up of 2½x5⁄8-in. bars, set two and two, and connected by steel pins 1¼ in. in diameter. These are turned down at the ends and riveted over steel washers ⅛ in. thick. These links and pins are duplicates of those used in the trip puller and trip maker, also the down-haul for the loaded cars. Cast-steel knockdown dogs are inserted in the chain at intervals of 10 ft., while a special car check is provided to hold the empty car at rest when it returns from the river-tipple kick-back.

This haul is driven from the countershaft of the down-haul for the loaded cars through a belt and one spur-gear reduction. The speed is 60 ft. per minute and the capacity four cars. The head and tail shafts are 5 in. and 3 in. in diameter, respectively, both being cold-rolled steel. The tail shaft is equipped with an extra-heavy take-up bearing having 15 in. of adjustment.

THREE SCREENS ARE PROVIDED

In this installation there are three screen rigs, one for the railroad tipple and two on the river tipple. These are of the standard gravity type for this district. The river-tipple equipment is so designed as to make it possible to load nut coal in boats if desired. Each river rig is also designed to operate independently of the other.

The structure in which this apparatus is housed is of heavy steel design. No metal less than ⅜ in. in thickness was used, thus providing for long life. The columns are 14-in. Bethlehem H-sections supporting 8-ft. plate girders, which carry the floor system.

The houses over the screen rigs are roofed and sided with corrugated asbestos-protected metal, manufactured by the Corrugated Asbestos Protected Metal Co., of Beaver Falls, Penn.

It will be readily perceived from the foregoing description and the accompanying illustrations, that great care has been exercised both in the design and installation of this plant. It would appear that all portions of the equipment had been designed with ample size, thus rendering the bearing pressures moderate, which should result in long and efficient operation.

Don'ts for Assistant Foremen and Fire Bosses

1. Don't fail to observe all the rules pertaining to examination for the safety of the workmen in your district.
2. Don't fail to see before entering the mine that the ventilating apparatus is running at the speed designated by the mine foreman.
3. Don't fail to see, before proceeding with your examination, that the air current is traveling in its proper course.
4. Don't forget to examine all places adjacent to live workings, when making your examination of every working place in the morning.
5. Don't use a light other than an approved safety lamp when making an examination for gas.
6. Don't fail to mark the date of your examination at or near the face of every place examined by you.
7. Don't fail to examine the entrance or entrances to all worked-out and abandoned places adjacent to the roadway and working places where explosive gas is likely to accumulate.
8. Don't allow any person to pass your station until you have notified him of the condition of his working place.

Note—From Susquehanna Coal Co.'s book of instructions to employees.

If any danger exists, see that it is removed before any person or persons are allowed to enter.

9. Don't fail to record the results of your examination in the book kept at the colliery for that purpose, stating the location and nature of any danger you may have discovered and immediately report the same to the mine foreman or his assistant.

10. Don't fail to make a second examination, where practicable, of every working place previously examined where men are employed, giving special attention to the roof and sides.

11. Don't fail to place a danger sign across the entrance to every working place and every other place where explosive gas is discovered, or where immediate danger is found to exist from any other cause.

12. Don't fail to place a danger sign at the entrance of every worked-out or abandoned portion of the mine.

13. Don't allow any person (except the mine foreman or some person designated by him) to pass beyond a danger signal until the mine, or that portion thereof, has been examined and reported to be safe.

14. Don't allow any person to remain in any portion of the mine through which a dangerous accumulation of explosive gas is being passed in the ventilating current.

15. Don't allow a light, other than a locked safety lamp, to be used in any working approaching a place where there is likely to be an accumulation of explosive gases.

16. Don't fail to examine the place, and adjoining places, before a blast is fired in a district where locked safety lamps are used.

17. Don't fail to caution the miner that after lighting a charge he should retire to a heading on the intake side of the breast, and not to a blind heading at any time.

18. Don't allow any person to work with a defective safety lamp.

19. Don't fail to report any dangerous condition which you may observe at any time.

20. Don't allow miners to work so far beyond the last set of timbers that their place becomes unsafe.

21. Don't allow an accumulation of gas to be removed by brushing where it is practicable to remove it by brattice.

22. Don't forget that it is the duty of the safety inspector to look only after the safety of the employees, and is not to relieve you of any of your duties.

23. Don't wait for the general inspector to point out dangerous conditions.

24. Don't forget that thorough and efficient examinations and inspections before accidents bring better results than the same work after an accident.

25. Don't forget that we expect you to help us educate the employees to take care of themselves, and this can be done best by personal instruction and attention.

26. Don't allow any person or persons to enter their working places where standing gas has been discovered except for the purpose of removing said gas, and only when accompanied by yourself or a competent assistant, and do not allow any persons to work in the return current until such gas is removed and the place made safe.

Extracts from a Superintendent's Diary

Our citizens are very fond of having their pictures taken and they never fail to patronize liberally any traveling photographer who happens our way—in this they are not very different from the great mass of ordinary everyday men.

When the artist happens upon his subjects away from home, standing about in groups, discussing mining matters, he has little trouble arranging satisfactory poses, but when he finds them singly at home his troubles begin; for example, if the would-be customer happens to be a groom, the business must be delayed until the bride can be found and then she must be given a chance to bedeck herself becomingly. At last when all seems fixed they recall that brides must always wear flowers and so a hasty search is instituted for a suitable bouquet.

Again they are about ready and the artist suggests the pose. Here again, unforeseen delays are encountered. They cannot decide whether the groom should stand and

the bride be seated or the bride stand and the groom be seated. The photographer makes suggestions but his suggestions are not accepted as final. The bride recalls that somewhere in a magazine she has seen a photograph of a famous man and his bride, and off she goes in search of the magazine. The photographer hesitates, he would like to pull up his camera and go in search of a more profitable subject, but he has already wasted so much time that he cannot make up his mind to do so. At last all obstacles are overcome and the bulb is pressed.

It would not be fair to assume that women are the cause of all of the artists' troubles. Some times men have to make a good many attempts before they can satisfy themselves about a proper pose. Shall they wear a hat or appear without one; shall they assume an ordinary everyday appearance or must they appear in lodge regalia or possibly as captain of the first-aid squad; and so forth and so forth.

A collection of all of the photographs in a camp very often suggests a complete and interesting history of the camp's existence.

Here is a group picture taken during the last strike with all of the belligerents lined up with their weapons proudly shouldered—Shot guns both single and doubled barreled, mostly breech loading, but not all by any means—pistols, knives, machetes, and clubs—men, women and children. Subsequently in court they were all very sure that no one was intimidated, but they took pains not to allow any of these photographs to follow them into the court room.

Here is a print showing the first-aid squad just as they looked after their third attempt to penetrate the inside workings, the day after the big explosion. The bunks in the background are part of the temporary morgue. The small flash light, showing all of the frightened women lined up behind a rope was taken about midnight of the same date at the pit mouth.

The blueprint showing the young ladies in holiday attire was made by one of the mining engineers; it is a part of the wedding party welcoming the boss driver and his bride back to camp. The balance of the party were busy re-arranging things in the bride's house according to well-established ideas governing such occasions.

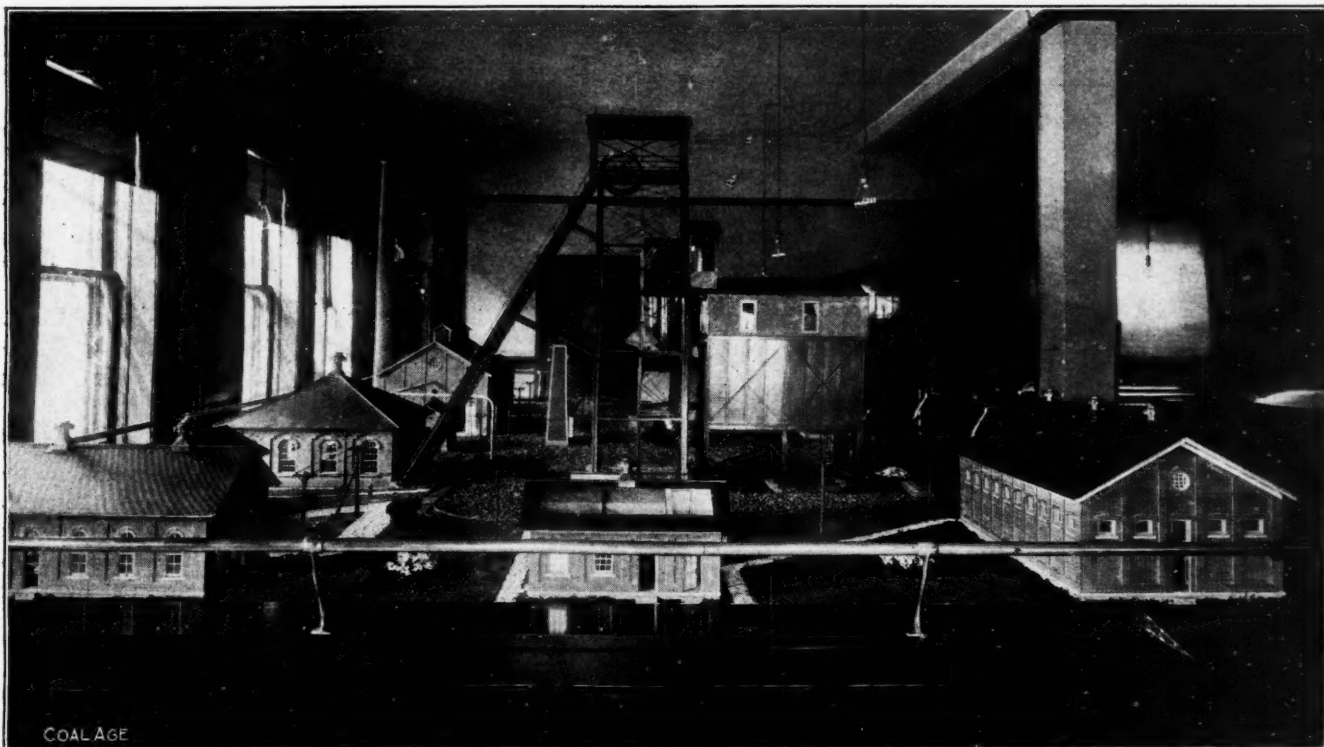
Today we had our prize fruit tree photographed at the request of a nearby Weekly that wants to give our camp a write-up. Think of miners planting fruit trees in rented yards and then living to see the trees bear fruit for their own families.

H. C. Frick Coke Company's Proposed San Francisco Exhibit

A \$10,000 model of a coke plant will be one of the features of the United States Steel Corporation's exhibit at the Panama-Pacific Exposition at San Francisco next year, and it is now complete and ready for shipment. The model was made by the H. C. Frick Coke Co. and for several days was on exhibition in the Frick offices at Scottdale. From Saturday until Tuesday the model was inspected by 6022 persons.

The plan is a replica of the Phillips plant of the Frick company. It is 16 ft. wide and 26 ft. long. Every feature of the Phillips plant has been reproduced with a model of the bath house at Standard added.

Briefly, the model shows the shaft and tippie, boiler house, engine house, fan house, lamp house, oil house, blacksmith shop and bath house. At one end is the coke yard, with both block and bank ovens. Careful attention has been paid to detail. When the model is erected at the fair, it will be operated just as a coke plant is. The self-dumping cages will ascend and descend the shaft, the laries will travel from the tippie to the ovens, the wheels of all the machinery will turn constantly.



GENERAL VIEW OF THE H. C. FRICK CO.'S PANAMA-PACIFIC EXHIBIT

Not only have the exterior buildings been drawn to scale, but the machinery is also in the proper proportion. Most of the work was done at the car shops of the company at Everson. There are exact models of the hoisting engines and those which operate the fans, as well as other machinery about the plant. Ultimately a turbine pump will be installed, and it will be shown how water is pumped out of the mine.

All of the approved safety devices are to be shown, even to the cage about the high ladder scaling the boiler-house smokestack. Regulation danger signs have been placed where they belong. Within the bath house and other buildings, the interior fixtures have been made to scale, down to the individual showers, etc.

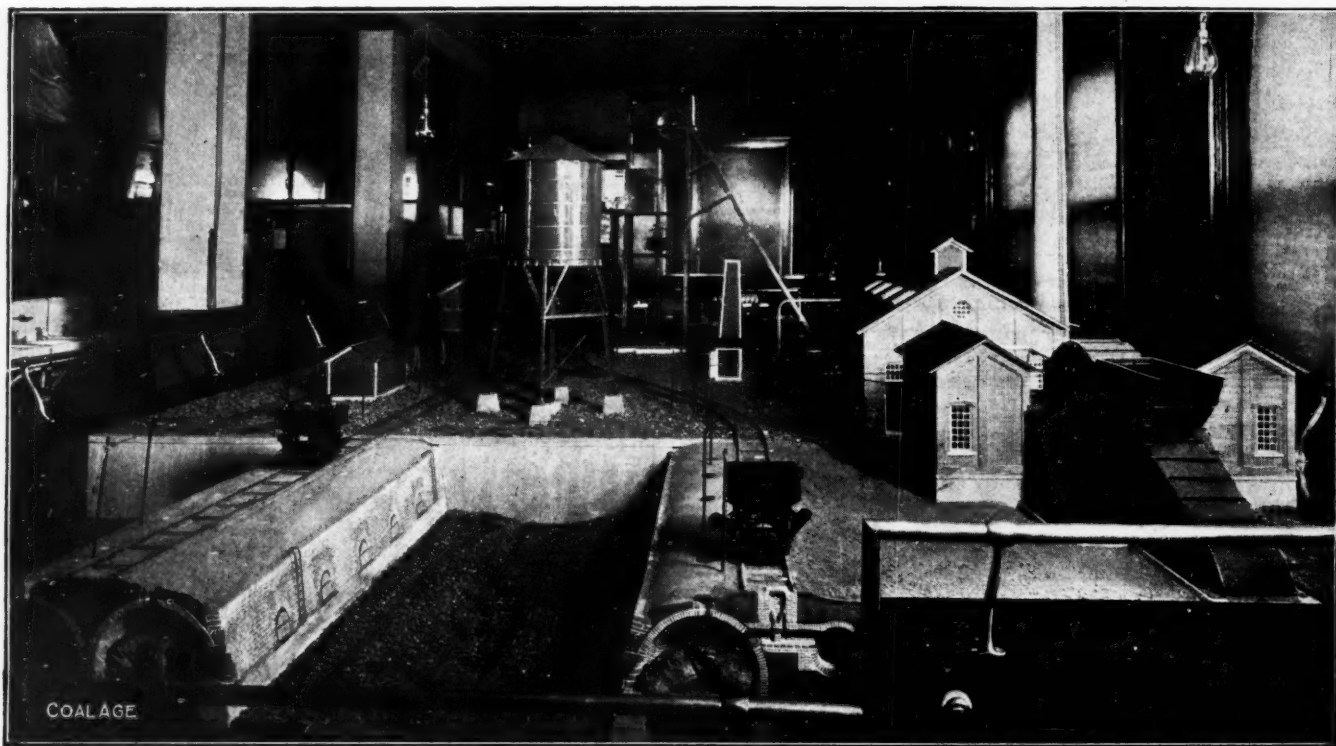
On the ground about the tippie the material yard has

There isn't a detail which has been overlooked, or if it has, none of the superintendents who inspected the model detected it. Virtually every superintendent in the region has passed judgment on the model and pronounced it perfect.

The machinery will be run by electricity at the fair, and the current will be generated from two generators which have been donated by the Westinghouse Electric & Manufacturing Co.

The model was built under the personal direction of T. W. Dawson, assistant chief engineer of the H. C. Frick Coke Co. Mr. Dawson will accompany the model to the Pacific Coast and supervise its erection. The company expects to make the shipment by Oct. 1.

In addition to this model, the Frick company will also



ANOTHER VIEW OF THE H. C. FRICK CO.'S EXHIBIT AT THE COMING SAN FRANCISCO EXPOSITION

been laid out, with its steel ties, pit posts and other things that are used about the plant. In the material shed are sections of firebrick, made in the shapes and sizes required for repairing the ovens.

The coke ovens are true to life. After much experimenting it was found possible to secure electric light globes for the interior which exactly imitate the color of a burning oven. At the end of each row of ovens a cross-section has been left open, showing the shape and construction of the ovens. On the bank ovens the waste-heat flues have been added. Through these flues the boilers are fired by the gases from the ovens.

There is the water tank, an important feature of a coke plant, and the hose house for the volunteer fire department. A tower for drying the hose after use was not overlooked. In line with the propaganda of beautifying the colliery surroundings, a flower plot has been laid out along the lawn between the bath house and the lamp house.

The mechanical coke drawer has not been completed, but it will be operated when the model is exhibited at the explosion. An emergency hospital will also be shown.

contribute a relief map of the coke region, the most complete that has ever been made. There will also be an exhibit of photographs and samples of coal. Various blocks of coal have been contributed from the various fields of the Steel Corporation, but the pride of all will be a column of genuine Connellsville coking coal, 8 ft. high and 16 in. square, bound in steel. There will also be a generous exhibit of Connellsville coke.—*Connellsville Courier*.

Explosion at the Mulga Mine

A local explosion occurred at 9 a.m., Sept. 5, at the Mulga mine of the Woodward Iron Co., about 15 miles from Birmingham, Ala. Fifteen men were killed and 16 injured. Two only of the 15 died from the violence of the explosion, the other 13 being suffocated by after-damp. On Apr. 20, 1910, the Mulga mine was the scene of an explosion resulting in the death of 40 men.

The West Virginia Coal Mining Institute will hold its winter meeting at Huntington, W. Va., on Dec. 9 and 10, 1914. Nell Robinson, president; E. N. Zern, secretary-treasurer.

Who's Who in Coal Mining

Wm. L. Schmick

One of the largest producers of coal in the State of Illinois is the Big Muddy Coal & Iron Co., with headquarters at St. Louis, Mo. The mines of the Big Muddy company in Illinois are located at Murphysboro, Harrison, Herrin and Clifford. These collieries have an output of approximately 8000 tons daily.

Much of the prestige and success of the Big Muddy corporation during the past year is due to the efforts of its vice-president and general manager, W. L. Schmick, whose extensive experience in the selling end of the coal business has been most helpful to his people in these days of semi-darkness in American commercial and industrial



WILLIAM L. SCHMICK

life. Mr. Schmick is one of those coal men who realizes in full that to mine coal is not all—there must be a market for the output produced. As a result of this most necessary understanding on his part, he devotes his attention largely to market development, and is as familiar with the trade end as he is with the operating end of the business.

Born in Baltimore, Md., in 1860, Mr. Schmick gained his early education in the parochial school of his native city. When 22 years of age, he entered the coal business as salesman for the Post & Hart Coal Co., in St. Louis. Continuing in his employment until 1886, he then accepted a place as sales agent for the Girard Coal Co., in the St. Louis district, covering this territory for the Girard people until 1891.

When the Consolidated Coal Co. needed an agent to take charge of its northwestern markets, Mr. Schmick was selected to fill the place, and was appointed its representative, with headquarters at Chicago. This job held

his attention for six years, at the end of which time the Consolidated company advanced him to the position of general sales agent for their entire output, at the same time changing his headquarters to St. Louis.

That Mr. Schmick served his corporation well for the next eight years is evidenced by the Consolidated company's action in appointing him vice-president and general manager of all its mines in July, 1907. He continued in this position until June 30, 1913. Just about this time the Big Muddy Coal & Iron Co. was looking for a man with sufficient experience to capably fill the place of vice-president and general manager of its coal operations. In its quest for a suitable candidate, Mr. Schmick loomed so large on the horizon of its vision that the search ended with his employment to fill the place he now holds. That was little more than a year ago, but today the comparatively new vice-president and general manager of the Big Muddy Corporation is a most intimate and integral part of the company's organization.

Mr. Schmick's entire attention has been given so exclusively to his coal-mining duties, he has had but little time to divert any effort to outside business interests. He is a director of the Union Fuel Co. in St. Louis, and in October, 1912, was elected president of the Illinois Coal Operators' Association. He is a member of the Mercantile Club, the Sunset Hill Country Club and the Algonquin Club, all of St. Louis. In Chicago, he belongs to the Traffic Club and the Automobile Club. He is an active member of the American Mining Congress and the Illinois Mining Institute.

The Checkweighman

While discussing with the general manager of a coal company the dispute over a checkweighman, which resulted in the shooting up of a mining town, he gave a chapter from his own experience. His miners had selected a checkweighman, who was in the habit of telling all men who came to the tippie seeking work what a poor place that mine was and advising them to look for a job elsewhere. The miners sent a committee to the manager about some misunderstanding, and after it had been adjusted to their entire satisfaction, the manager said he had something he wanted to discuss with them. He detailed to them what the checkweighman was doing and asked them to put some other man in his place.

At a meeting held by the miners shortly afterward, this request was considered, but the hotheads, as usual, argued that as the manager wanted to get rid of the checkweighman, he was just the man they wanted, and so the request was refused. The manager made no comment, but a week or two later, casually stepped up to the checkweighman, who was sitting with a group of men, and called him to one side, sat down and talked with him for ten or fifteen minutes, passed him out a good cigar and when he left him, slapped him on the shoulder in a "hail fellow" spirit. At intervals he repeated this performance. The result was that the same hotheads who had opposed his requests, now said the checkweighman was getting too chummy with the manager and succeeded in ousting him from his position.

The electric current-carrying capacity of an aluminum wire of any given size may be taken as 84 per cent. of the capacity of an equal sized copper conductor.

Editorials

The President and the Colorado Situation

The public has been severe on the Rockefeller family in relation to the Colorado situation, alleging that while owning a large block of stock in the largest company in Colorado, it has been willing to leave the business control in the hands of its representatives. We have been ready to admit that the absenteeism of the Rockefellers was a real misfortune but one which naturally arises from the large extent of their interests.

Now, however, another person has essayed to control the Colorado situation and he, as little as the Rockefellers, understands the conditions which he desires to control. He also is an absentee and dependent on what others tell him. His lack of knowledge is also excusable for he has many other and severe duties pressing on his attention. We refer, of course, to President Wilson.

It is true that he has the results of the congressional investigation to inform him and it is extremely creditable to him that he tacitly overlooks its findings and bases his conclusions on other premises. We congratulate him on knowing that the purpose of committees of Congress is to manufacture political capital.

But we cannot feel he has been fortunate in choosing the men to enlighten him on the situation. One of the two was William Fairley, a member of the National Executive Committee, at least till Nov. 30, 1913, of the organization which was endeavoring by creating disorder to prevent the operation of the mines in Colorado. In 1904, he was an organizer and agitator in that state. The judgment of such a man could not well be regarded as *ex parte*.

To balance him a man, Hywell Davies, was chosen, who was, at one time for a short while, president of the Kentucky Coal Mine Operators' Association. Apparently he, while passing as a coal operator, has not acted in that capacity for several years, and in fact it is hard to connect him now in an operating way with the coal industry. He appears to be a man well liked by all associated with him, but it does not seem that he was in any way a fit balance for a paid organizer of the United Mine Workers' Union.

These two investigators stayed 10 weeks in Colorado, but at no time, we are told, did they present any letters of instruction or other credentials to the operators. When Mr. Davies first arrived in Colorado, he called on D. W. Brown, J. C. Osgood and S. F. Welborn. About the time he left he called on Van Mater and C. L. Baum. This was the extent of the effort Hywell Davies made to learn the views of the operators, according to our informant, the inquiry of our correspondent having been made at the meeting on Sept. 20, when the signatories of the letter to the President quoted last week were present.

The operators of Colorado, therefore, do not believe that the President has been adequately informed relative to the conditions in that state and the crude proposition offered suggests such a lack of acquaintance. The terms of the proposal are vague and indefinite and overlook facts which

everyone should know. Into these defects it is not necessary to enter because the operators themselves in their reply to the president have explained the inadequacy better than we can.

The only right Mr. Wilson had to interfere in Colorado was derived from the fact that a state of disorder existed. The only right by which he may now withdraw, especially now he has taken the arms from the operators, is based on the fact, real or presumed, that disorder will not result. It cannot lawfully be done for any other reason. It must not be done to coerce anyone, to enable anarchic violence to perform what may not, or has not, been done by legislation. If his duty required him to withstrain the lawless, the duty is not now removed unless he believes the lawless are already permanently restrained. He cannot say that he will not permit his truce to be rejected. If he does he sets himself above the law and seeks to legislate for the people.

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A New President for the A. I. M. E.

The presidential nominating committee of the American Institute of Mining Engineers is endeavoring to sound the membership for an opinion as to a successor of retiring President Thayer. The deliberations of the committee must be concluded this month, and opinions and ideas on the subject are being solicited.

This seems to be a propitious time for the coal and coke members to enter more actively into the affairs of the Institute. Particularly is this so now that one of the most successful meetings in the history of the Institute is just being concluded under the auspices of the coal and coke committee at Pittsburgh. Under the new regime, a new era has been inaugurated in the Institute; it has been rejuvenated, gained a new vigor and a greater strength, and the fuel members should support this innovation.

With a presidential nomination now up, the question arises, is it not time that the coal men put forward a nominee? There are certainly many convincing reasons for doing so, and the encouragement which the Institute has recently been offering for broadening and enlarging upon the scope of the work of the coal members would seem to indicate that such a proposal would be favorably regarded by the other members.

Strange as it may seem, though the American Institute of Mining Engineers originated in the coal regions of Pennsylvania, there are only three of its presidents who have been in any way directly connected with the fuel industry. And it has now been two decades since a coal man has occupied the presidential chair. We, of the fuel industry, well appreciate the fact that the past presidents have been men of conspicuous ability, some of whose names will go down in history for their noted achievements in scientific lines. But we also feel that the coal industry has produced some equally powerful figures whom the Institute could not honor too highly.

The Export Coal Trade

Let us say first that any coal company or selling agency, with coal of the necessary quality, that is prepared to give extended credit can get foreign business, but it is doubtful if it will always get its money.

There is now plenty of good coal available and there are ships to be had, at a price, but the financial end of the business is far from satisfactory. At present our exporters or those who would be exporters, know but little about ocean freights and charters, port charges, unloading conditions, etc., and will only sell coal f.o.b. tide-water, requiring cash against documents before they will allow their coal to be actually shipped. They know that the financial situation, in the countries needing our coal, is generally bad and will take no risks.

Exporters must realize that the essence of the export coal business is transportation, and that before they can get any large share of the world's foreign coal trade, they must learn the devious ways of ocean transportation and provide the required facilities.

Our competition in the export coal trade, in the past, has been due to opportunities that have come about through outside causes. The British coal strike in 1902 gave us the West Indies markets, which we have never lost, not because we had better coal, but because, in addition to cheaper mining costs, we found iron ore and sugar for return cargoes.

The British strike of 1912 did us little good, because we failed to take advantage of the opportunity offered us to increase our exports, getting only such additional business as was offered, but which we failed to retain when British shipping returned to normal conditions.

Even now, with the chance given by the war, there has been no organized, systematic effort to increase our coal exports; it is all spasmodic, each company for itself after its own plans, usually based on insufficient knowledge of conditions, either of transportation or of finances and credits.

To capture and retain the foreign coal markets, we must follow the example of Great Britain's exporting companies and understand the basis on which they have worked.

They have coal of first-grade quality; we also have coals equally as good in heating value.

They mine and prepare their coal to suit the wishes and needs of the consumer; we prepare our coal as we think best or do not prepare it at all.

They have the necessary loading facilities that will handle coal with the least possible breakage; we load our coal into ships much more quickly, but with little attention to breakage.

They build and own their own colliers; we are entirely dependent on other nations for ocean transportation.

They have established or control their own agencies; we have now but local agents, who often handle British coals and over whom we have no control.

They build or obtain dock and storage facilities and coaling stations; we have nothing of the kind at foreign ports.

They have created and maintain banking and financial agencies in foreign countries; we are entirely dependent on foreign banks.

They meet the consumers' or buyers' views as to sales conditions and credits; we generally refuse to do so and insist on our own conditions, or no sales.

To sum up, the export coal trade is a business in itself and to succeed in it, it must be studied and learned like any other business; every factor in it (and there are many) must be allowed for and made a part of the whole, otherwise we shall never succeed in obtaining and holding our share of it.

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The Pittsburgh Coal Co.'s 10% Wage Cut

The Pittsburgh Coal Co. has announced a general horizontal reduction in the salaries of all employees drawing \$100 per month or more, excluding, of course, all members of the miners' union. The announcement was not entirely unexpected as it has been under consideration for some time, and it is more or less in line with the policies adopted by several of the largest corporations in the country. In such periods of acute and protracted depression as this country has been laboring under, rigid retrenchment propagandas have been necessary; and, particularly is this so in the case of concerns like the Pittsburgh Co., who are carrying a heavy indebtedness.

While the position of this individual company is not, therefore, open to a general criticism, there is an objectionable phase to the move that cannot be overlooked. This is the throwing of the entire burden of the reduction upon the official personnel of the company and excluding organized labor entirely. The reason is, of course, obvious, the wage agreement with the labor unions making a reduction in that direction impossible without precipitating immediate strikes among the miners. In this we see a tacit acknowledgment of the latent power of organized labor whose rights and demands must be given precedence over every other consideration.

As pointed out in a previous editorial* on this subject, while the company officials form the buffer between capital and labor, the unions have been consistently forcing more and more concessions from capital, which, in the aggregate, has greatly enhanced the cost of living. On the other hand, salaries paid the official forces have, in the main, been stationary, or even suffered a moderate reaction as in the case above cited. The minor official in the coal offices has, therefore, been facing the problem of maintaining appearances commensurate with his presumably superior position, while the buying power of his salary is being constantly restricted to narrower limits. Indeed, one might quite pertinently ask if this constant enhancement in the cost of labor and the apparent small premium placed upon the economic value of the brain worker is not of greater significance as portraying the trend of conditions in our country than is commonly thought.

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Even if machines are eventually proved to have a slightly higher fatality rate per man employed than hand labor, their greater productive rate would bring down the death rate of the industry. We are bound to get the coal and we desire to get it with the least number of fatalities possible. We could reduce the death rate per man by putting a few figureheads in safe places below ground, but what good would that do if the death roll per ton mined were unchanged.

*See "Miners' Work and Wages," Coal Age, Vol. 6, p. 273.

The Labor Situation

SYNOPSIS—The labor situation is unchanged everywhere. The operators in Colorado persist in their determination not to yield to the threat of the President, and in eastern Ohio they are holding steadily to a mathematical equivalent of last year's wage.

The Colorado operators are quietly, but nevertheless firmly, of the determination that they will not yield to the President's threat, and so far the President has sense enough not to commit the iniquity he has purposed. So far the troops are not withdrawn, nor will they be, we feel confident, till the strike is settled by the withdrawal of the armed desperadoes from the tented villages throughout Colorado. Perhaps no settlement will be possible till all the perpetrators of past violence are in jail and serving their appropriate sentences. But it is likely that shortages of money will make an earlier termination of hostilities necessary.

Eastern Ohio

In eastern Ohio there is no change in conditions. The miners are extremely angry with Thomas L. Lewis, the former president of the United Mine Workers of America, because he has urged a settlement on the operators' terms. Reproachful letters have appeared signed by Italian miners and by local unions.

Headed by the Maynard and Barton brass bands, about 1000 miners from the unions of Maynard, Neffs, Provident, Fairpoint, Blaine and Barton marched to St. Clairsville on Sept. 28. They paraded the main street and assembled in front of the court-house steps, where several speakers addressed them. The demonstration was caused by the injunction suit filed by the Youghiogheny & Ohio Coal Co. against Obed Hardesty, Father McEachen and others to prevent them from mining coal at the mine recently opened on the Hardesty farm. The company declared that it owned the coal which the miners desired to work.

The striking miners are receiving \$8 per week from the union. Sub-district president, C. J. Albasin, left Sept. 28 for Indianapolis. He desires to borrow \$10,000 from the Illinois district.

Allowable Impurities

The Ohio Industrial Commission has been asked to determine the percentage of impurities allowable in the Crooksville district. Because the bed is thin and the impurities not so general as in the Hocking Valley field, it was decided that only 75 lb. of impurity should be regarded as permissible, whereas in the field mentioned 100 lb. has been allowed. All impurities over 75 lb. are made subject to docking.

Compensation for Injuries

The smaller operators who lease their mines for operation, will be affected by a decision of the State Industrial Commission, which makes the owner liable for compensation in all cases of injury. This ruling was made in the case of the widow of Thomas McAllister, in a suit against the National Fire Proofing Co., which owns mines at Haydenville, in the Hocking Valley district. It is said that the desire of the mine owners to maintain the mine in good condition has resulted in most contracts to lessees being so drawn that the lessee is not an independent contractor, but merely an agent of the owner. Under the ruling of the commission, the National Fire Proofing Co. is required to pay McAllister's widow \$2600. Neither the company nor the lessees were contributors to the workmen's compensation fund of the state.

West Virginia

In the Cabin Creek district, West Virginia, there is much unfavorable comment regarding the union officials, and an "Efficiency League" has been organized. At Beechgrove, near Crown Hill, on Sunday, Sept. 27, a ticket for the district organization was named as follows: Walter Deal, Cedar Grove, for president; W. F. Ray, Black Betsey, vice-president; Norman Atkinson, Crown Hill, for secretary, and J. L. Workman, national board member.

For purposes of record, we supply the details of two recent settlements in West Virginia. The Four States Coal Co. has made an agreement with the United Mine Workers' Union, District No. 17. The contract will expire Mar. 31, 1916. The new agreement gives unreduced pay to the day workers in the mine, despite the reduction in the hours of labor from 10 to nine hours. The machine-mining rate is unchanged, namely, 31c. per ton. A higher rate had been demanded, but as the company pointed out, the rate paid is higher than that prevailing on Coal Creek and Cabin Creek. The contracts with the Milburn Coal Co. and the Solvay Coal Co.

still remain unnegotiated, but a speedy agreement is expected.

The Paint Creek Collieries Co. has at last completed its temporary contract by inserting the rates for machine-mined gas and splint coals. The price for the former is to be 26c. per ton instead of 25c., as in the past. In narrow work, the rate will be 5c. higher. The rate on splint coal will be 29c. instead of 32½c., as was asked and as is paid in the Kanawha district. The general lines of the contract were laid last spring, but the tonnage rate remained as a bone of contention, and an arbitration board was created, consisting of W. Wood and J. Martin for the operators, and A. D. Lavender and W. Patrick for the miners. Finally, to break the deadlock, C. E. Krebs was appointed as referee to sit with the other four arbitrators. The gas-coal price is that paid in the Kanawha district by those operators who are affiliated with the Kanawha Coal Operators' Association.

Recent Judicial Decisions

Effect of Illinois Compensation Act—The Illinois Workmen's Compensation Act does not prevent suit against a coal mining company for injury resulting to a miner from the company's violation of the safety requirements of the Mining Act, such as failure to sprinkle, spray or clean the roadway of an entry, whereby an explosion occurs. (United States Circuit Court of Appeals, Seventh Circuit; Eldorado Coal & Mining Co. vs. Mariotti; 215 Federal Reporter 51.)

Responsibility for Unforeseen Accident to Pedestrian—A pedestrian passing along the main track of a railroad company near a coal company's tippie is not entitled to recover from the coal company for injury sustained by her on being struck by a lump of coal bounding from a chute while a car was being loaded at the tippie, in the absence of any showing that the accident could reasonably have been foreseen and prevented by the coal company, although a foreman of that company had assured plaintiff that she might safely proceed along the track. (United States Circuit Court of Appeals, Fourth Circuit; Kirk vs. West Virginia Colliery Co.; 215 Federal Reporter 77.)

Proof of Damage under Breach of Contract—To fill his needs, plaintiff contracted for 50 carloads of coal to be delivered by defendant during a certain period as ordered, and made a similar contract for a like quantity with a third person. Although he ordered out the 50 cars which defendant had agreed to sell, only five were delivered, and the seller under the other contract made no delivery. To obtain the necessary 100 cars, plaintiff was required to buy elsewhere at prices ranging from 50c. to \$1.25 a ton above the price at which defendant had agreed to make deliveries. Held, that these facts were sufficient to constitute a basis for computing plaintiff's damages recoverable against defendant for breach of the contract: the two contracts not being so intermingled as to prevent a determination as to the approximate loss sustained by plaintiff through defendant's breach. (Kansas City Court of Appeals, Eaton vs. J. R. Crowe Coal & Mining Co., 165 Southwestern Reporter 1170.)

When a Mine Owner Is Not Required to Support Surface—In the recent case of Graff Furnace Co. vs. Scranton Coal Co., 91 Atlantic Reporter 508, involving the liability of defendant for injury caused by it in mining operations to the overlying surface of land owned by plaintiff, the Pennsylvania Supreme Court said:

"It has long been settled in this state that, where there is a separation of the minerals from the surface, the owner of the mineral estate owes a servitude of sufficient support to the superincumbent estate. That principle was announced in Jones vs. Wagner, 66 Pa. 429, nearly a half century ago, and it has since been uniformly recognized and enforced. Equally true, however, is it that the owner in fee of the entire estate may grant the mineral estate and by apt words in the deed of conveyance may part with or release his right to surface support, and, where he does so, his grantee or those claiming through him may mine all the coal, even though it should result in the surface falling in. The owner of the entire estate, may likewise grant the surface of the land and reserve the mineral estate with the right to mine and remove it without liability for any injury or damage done to the surface, and in such case the grantor or those claiming through him may mine and remove all the coal without being compelled to support the surface. These rights of the owners of the servient and superincumbent estates in land are settled by numerous and some very recent decisions of this court."

The court further holds in this case that a reservation of right of surface support in a deed conveying the surface of mineral lands, need not be signed by the grantee.

Discussion By Readers

The Reverse or Counter-Current Theory

Letter No. 10—The recent discussion by Messrs. Verner, Ashworth and Parfitt shows the deep interest that is taken in everything pertaining to coal-dust explosions. The letter of Mr. Ashworth, *COAL AGE*, Sept. 5, p. 398, makes it clear that Mr. Verner's claims in regard to the counter-current developed at the moment of a dust explosion in a mine, have not been presented in a manner to be understood by all.

While we may not be able to agree with Mr. Verner wholly, in his attempted explanation of this theory, he should be congratulated for having the courage to voice his convictions in the face of opposition, and for having persistently kept this important subject alive by discussion, for it is by this means that a right conclusion may be reached. Mr. Ashworth, also, can claim an equal share of recognition, because of the tenacity with which he has handled the subject and demanded proof in the shape of observed facts. Many men are satisfied to "play safe," never leaving the old beaten track and the world is none the wiser for their living.

It is not my intention to attempt a discussion of this theory, but to refer briefly to one or two points that have been mentioned. In regard, first, to Mr. Verner's claim of a "counter-current" traveling in an opposite direction to that of the explosive blast, I recall that no less an authority than Sir Frederick Abel tells us that air at a lesser pressure will travel against an explosive wave of greater pressure, which seems to be Mr. Verner's theory, briefly stated.

Again, reference has been made to the Eskmeals experiments undertaken for Mr. Dean, and which showed conclusively that there is an inrush of air during the course of the explosion. This inrush of air is evidently the result of a lowering of the pressure at some point in the mine, which would naturally be followed by a rush of air toward the point of lower pressure. We may justly conclude that the inrush of air, at the Eskmeals experiment, is evidence that a partial vacuum was formed at some point in the tube during the progress of the explosion.

In this connection, it has been pointed out that such a vacuous condition is probably the result of a sudden cooling of the gases, at a point where the conditions were unfavorable for the combustion of the coal dust; as, for example, a wet zone or a stone-dust zone. However, the Eskmeals experiment does not seem to prove that the out-rush of the explosive wave and the inrush of air took place at the same time; but, rather, that these currents were produced by certain pressures that acted in their respective directions, the one due to the expansive force of the blast exerted principally along the roof and the other being the atmospheric pressure acting against a more or less vacuous condition at the floor.

If Mr. Parfitt admits that an explosion of any kind, whether it be a shot in the coal or an explosion of coal

dust, causes an equal pressure in every direction, it is hard to understand how he would explain his "partial vacuum" at the face of the coal surrounding the shot. I have always considered that when a shot was discharged at the face of a room, the pressure due to the blast was equal everywhere in the room. If this is true, there could be no vacuum formed at *C*, as he states.

When an explosion of coal dust occurs in a mine, it is evident that the mine air is, for the moment, in a state of compression, which extends its influence a slight distance outside beyond the opening. If, now, after the mine pressure has reached a maximum, there is a slight decline, owing to the cooling of the gases in the mine, there would naturally result an inrush of air from the outside, until equilibrium was again established; and this outrush and inrush of air would be repeated one or more times, as the result of other explosions in the mine or any causes that would raise and lower the mine temperature and pressure.

ROBERT McCUNE.

Dawson, N. M.

The Mine Foreman

Letter No. 9—In the discussion of the many qualifications a mine foreman must possess, too much emphasis cannot be laid on the idea that he should be a practical as well as a theoretical man. His success as a mine foreman is not determined by the knowledge he has acquired in the use of textbooks or by his ability to successfully pass an examination for a certificate of competency. The foreman who has a practical knowledge of the work in charge impresses his subordinates that he knows what he is talking about; and his orders unconsciously carry the conviction that his instructions must be carried out and obeyed.

It is important that the mine foreman should be a man of detail. He must make himself familiar with all conditions existing in the mine, by personal investigation. This requires energy and a persistent determination, on the part of the foreman, to observe any infringement of rules or negligence in the performance of work, and to quickly bring the same to the attention of the party at fault. In every mine, men are found who make a continual practice of violating rules, in order to facilitate their work. In many cases, they jeopardize not only their own lives but those of their fellow workmen by a willful act or neglect. It is important that the mine foreman should show himself alive to such practices and maintain the discipline of the mine.

It has been said that the Union will support a man in the violation of rules and orders. My experience in the handling of this class of labor for a number of years convinces me that such a statement is unfair to organized labor. I have known cases where a violation of rules has been presented to the Union as a grievance, by a member, and later brought to me by the pit committee. In every instance, I have been able to show that it was a direct violation of orders or mine regulations and rules laid down for the safety of the men and the security of the

property. As a result, I have never failed to secure the support of the committee.

A successful mine foreman must be capable of judging the amount of work a man should be able to do, in every department of mining and under different conditions, if he works conscientiously. Then, when making his daily rounds, he will be able to detect any shirking of the work. Many men, when not watched closely, are prone to take advantages. They are afraid of doing more work than they are paid for, forgetting that the man who never does more than that for which he is paid, will never be paid for more than he does. This is a true maxim, which every worker should regard.

One of the things that tests the ability of a mine foreman most severely, in many cases, is the attempted installation of new machinery or a new method of operating. In his endeavor, he is almost invariably opposed by the strong prejudices of the workmen, simply because they have never seen the machine or the method tried before. It is a well known fact that men must work with a will to insure the success of a new undertaking. Scores of good and efficient systems and installations have proved a failure through the lack of coöperation on the part of the workmen employed.

For this reason, a successful mine foreman must be competent to change the system of working whenever altered conditions require such a change. In order to introduce chain machines where punchers are being used, it is necessary that the mine foreman select an efficient, reliable man to run the machine and then personally watch the work; calculate the amount of coal undermined; and observe closely the effect of blasting the coal and the amount of powder required, and compare these results with those obtained by the use of the punchers.

When introducing a new system of haulage, or an extra locomotive on the present haul, or when making a new run with the locomotive, the foreman should ride the locomotive himself for a few trips; note the time it takes to make the trip and the time required for switching. The motorman, on that trip, will then know that the foreman has a practical knowledge of the work required and that he must give a plausible excuse for any delay.

Without question, a successful mine foreman must be a good judge of human nature, in order to handle the different classes of men he employs. He must be able to select the best men from those who apply for work and to distribute the men to the best advantage, giving to each man the work he is best fitted to do. This will not only avoid trouble in the future, but will reduce the number of accidents in the mine.

Above all, the mine foreman must be observant of the ventilation, drainage and timbering of the workings. He must provide good ditches at the sides of all roads and see that these are kept clear of refuse. As the successful operation of the mine depends primarily on the *car of coal*, nothing is more important than the maintenance of good roads. It is important that these be well timbered; and the timbering must be closely watched to observe any evidence of excessive weight. A roof cave on a haulage road is not only a menace to safety, but practically shuts down that section of the mine, as no coal can be hauled until the obstruction is removed.

Finally, the mine foreman must be a man of foresight, capable of looking ahead. He must keep his development work in advance, so that any unforeseen occurrences, such

as running against a fault, or a squeeze shutting off a portion of the mine, will not reduce the daily capacity of the mine, for which he is responsible.

J. W. POWELL, Supt.,
Cottonwood Coal Co.

Lehigh, Mont.

Letter No. 10—I have been a constant reader of COAL AGE, for some time, and to say that I have enjoyed the interesting discussions by many of the ablest mining men in this country would be putting it mildly. These discussions have been a great help to me, as they have been to others of my acquaintance. I have been interested in the recent discussion of The Mine Foreman, and offer a few comments, in hopes of seeing it further discussed, as it is a most important subject.

I have often felt that there was a great lack of earnest coöperation between many mine foremen and the respective mine inspectors of the districts where they are located. No argument is needed to prove that the sooner this condition is remedied, the better it will be for all concerned. There should be a feeling of true friendship existing between every mine foreman and his inspector. The same responsibility rests on the shoulders of each of these men, who should work together in earnest efforts to increase the safety of the mine and thus reduce the accident list.

I believe that we have as good inspectors in Alabama as can be found in any state; and there isn't any doubt but that they are doing all in their power to reduce the number of accidents occurring in the mines. It is up to us, as mine foremen, to coöperate with the mine inspector in our own district in every way possible. The way to coöperate with the inspector is to listen to what he has to say when making his inspection of the mine. As a rule, when an inspector recommends a certain thing, it is not his own individual opinion, but the result of matters he has discussed with his associates in mine inspection.

I recall the mine foreman who, just a week or two before the inspector was supposed to make his regular visit to the mine, put on an extra crew of men to clean up the mine and get it in shape for inspection. I have been told of other instances where the inspector told the foreman to make such and such changes; and the foreman would forget all about it or postpone doing the work until nearly the time for the next visit of the inspector, although he was in daily contact with the conditions to be remedied, and there was no reasonable excuse for his delay in making the changes requested.

We should not be so narrow minded as to think that when an inspector offers a suggestion that, in his opinion, would prevent someone from getting injured or killed, it is not a one-man's idea. The suggestion is made in good faith and is born of experience. While the number of mine fatalities is greater in this country than anywhere else, in proportion to the coal mined, we may hope with active coöperation to reduce this high death rate in mining.

Some years ago, the first-aid movement found its way into coal mining. It has proved a blessing to the miners everywhere, and has spread so fast that, now, every coal-producing state has its first-aid teams. The result is that hundreds of lives have been saved through their efforts.

It is essential that every foreman produce a good cost sheet; but it is just as essential that every foreman should devote some time to looking after the safety of the working places and to keep the entire mine in a sanitary condition. He should do this the same, the day *after* the inspector makes his visit as the day *before* the visit. I am glad to say that there has been a vast improvement, in this respect, and the mines today are in a much better condition than they were 15 years ago. Mine legislation has much to do with the advance made in this direction.

In conclusion, let me say, let us all work together in harmony and remember that in unity there is strength; and that great things may be accomplished by coöperation.

J. F. SMITH, Mine Foreman,
Alabama Consolidated C. & I. Co.

Lewisburg, Ala.

Electric Mine Locomotive

I notice, in your description of the second electric mine locomotive installed in the anthracite region at the Hillside Colliery (1889), COAL AGE, Sept. 5, p. 385, the credit for the design of the machine is given to Mr. VanDerpole. Permit me to correct this statement to the extent of saying that I succeeded in inducing Sup't May, of the Hillside Coal Co., to install this motor, only after guaranteeing a saving in expense of haulage. I designed the machine in Scranton and the order was sent to the Thompson-Houston Electric Co., at Lynn, Mass., before

Mr. VanDerpole's connection with that company. The design was rejected on the ground that a 40-hp. machine could not be built within the dimensions specified.

About seven months later, the design was gone over by Mr. VanDerpole and myself, with the result that the only change made was to cut down the weight by making the covers of the wheels in wood. As the machine would not pull its load, I was compelled later to replace these wooden covers with iron castings. I will state, however, that the winding of the motor and the design of the pole is entirely Mr. VanDerpole's work. The conditions in the gangway of the mine would not permit the use of the present trolley pole.

The installation of the plant, however, was entirely in my hands as consulting engineer for the company. The next machine was built entirely under my direction and installed by me, first, at Blossburg and then removed to Forest City, being found too large for the work at Blossburg. The expansion bolts were used, first, at Mayfield, and then on the VanDerpole-Thompson-Houston line, in Scranton. I first adopted the method of running wires through pipes (1888) when lighting the main haulage road at Burley Colliery, Sheffield, England. It may be interesting to note that this was the first coal mine lighted by electricity, which plan I think was first adopted in 1883.

FRANCIS A. POCKOCK,

Philadelphia, Penn.

Study Course in Coal Mining

The Coal Age Pocket Book

The Operation of a Siphon—There are a few practical points, in the operation of a mine siphon, that demand consideration, as upon these its action depends. The most important of these are the following:

1. In order to **start a siphon**, the pipe must first be completely filled with water, from the intake to the discharge end; and to accomplish this a valve or stop-cock is required at each end of the pipe. When **valves** are used they should be of a type that will offer the least obstruction to the flow of the water, the gate valve being best for that purpose. If **stop-cocks** are used they should provide a passage equal to the full area of the pipe. A **foot-valve** is often used at the intake end, in preference to any other type, because it is automatic in its action.

To **fill the pipe**, all valves are first closed, and water is then poured into the funnel or opening at the summit or crown of the siphon, until both legs of the pipe are full, time being given for the escape of air that may be entrapped in the pipe. When the pipe is apparently full close the opening at the crown and open the valve at the intake end, which will cause a vacuum condition to form at the summit and assist to drain any air still remaining in the pipe, to that point. Again, close the intake valve and displace any air found at the summit by completely filling the pipe with water.

Finally, having closed and sealed the opening at the crown, open first the intake and then the discharge valve. The intake valve should be opened to its full capacity before starting to open the discharge valve. The latter should only be opened gradually, thus giving ample opportunity for overcoming the inertia of the water and reducing the liability of air entering the pipe.

The suggestion of using a **pump** to start a siphon is a poor suggestion. A siphon should be **primed**, in starting, in the same manner as a suction or lift pump is primed to enable it to act.

2. **Air-Tight Joints** are an absolute necessity to insure the successful operation of a siphon line. Air will enter a pipe, in siphoning, through a joint that is perfectly water-tight. In large pipe lines with flange joints, rubber gaskets dipped in tar should be used. The screw-joints of smaller pipes should be put together with lead. It is a very bad air-leak that can be detected by a lamp or candle held at the joint.

3. The **accumulation of air** in a siphon line cannot be wholly avoided by the effectual submergence of the pipe ends and maintaining air-tight joints. Water always contains more or less air that it has absorbed from the atmosphere and holds mechanically. Under the vacuum condition that exists at the summit of a good siphon, the air held by the water tends to escape and then accumulates in ever-increasing amount till it impedes or completely shuts off the flow of water through the pipe.

This can only be avoided by so proportioning the size of both the intake and discharge pipes that the pipes will flow full and the air be swept away by the water as fast as it accumulates.

The Coal Age Pocket Book

PUMPING

The work of pumping water from a mine shaft or slope is often a difficult problem, owing to the great depth of the shaft or the length of the slope. In many cases, it is necessary to perform the work in stages or lifts, in order to avoid the excessive strains due to a high lift.

The rapid corrosion of the pipes and the valves and linings of the pumps, owing to the action of the acid mine water, is also a matter causing much annoyance and trouble. To overcome this difficulty, it is necessary when the mine water is very corrosive, to use wooden pipes and pump linings or to employ other acid-resisting material.

Theory of Pumping—In the common system of pumping water, there is a suction end and a discharge end. The pump separates these two branches of the system, and is the means or agency producing the flow.

A pumping system is not a gravity system where water flows by gravitation from a higher to a lower level. On the contrary, the pump is the means by which the water is lifted from a lower to a higher level.

Briefly stated, the action is as follows:

1. The pump, by its action, produces a more or less perfect vacuum, in the pump barrel behind the piston or plunger, in its forward stroke.

2. The pressure of the atmosphere, acting on the surface of the water in the sump or basin, forces it up the suction pipe and through the valves into the vacuum space in the pump barrel.

3. On the return stroke of the pump, the intake valve is closed by the pressure of the water, which is forced out of the pump barrel and through the discharge valve into the column pipe by which it is discharged at the surface.

The Suction Head—This is frequently called the "suction lift" of the pump. It is the vertical height of the center of the pump barrel above the surface of the water in the sump. The suction head must always be less than the atmospheric head, in order to make due allowance for the friction head and the velocity head, which must be overcome before the pump can draw water from the sump. As stated in respect to a siphon, the suction head of a pump in feet, may be taken, in general practice, as nine-tenths of the barometric pressure in inches. With a vertical lift and a good pump, the suction head can safely exceed this amount.

The Discharge Head—This is the vertical height of the free discharge of the column pipe above the pump. The discharge head is only limited by the available steam pressure at the pump multiplied by the square of the ratio of the diameter of the steam cylinder to that of the water piston or plunger.

For example, if the steam pressure available at the pump is, say 50 lb. per sq.in. and the diameter ratio of steam end to the water end is 2, the pump will operate against a water pressure of $50 \times 2^2 = 200$ lb. per sq.in.

Inquiries of General Interest

Steam-Boiler Efficiency

In the October issue of one of my mining journals, in an article entitled "Efficiency of Steam," I read as follows:

As water is converted into steam at 212° F., 14,500° F. should convert 68.4 lb. of water into steam ($14,500 \div 212 = 68.4$); but an excellent evaporation under a boiler is 7 lb. of water per pound of coal, or $7 \times 100 \div 68.4 = 10.2$ per cent. of what should occur.

From this statement, the writer of the article proceeds to calculate that, with a feed-water temperature of 100 deg. F. and using steam at 70 lb. gage, the consumption of coal is $30 \div 7 = 4.29$ lb. per boiler horsepower per hour.

I have compared this article with the answer to an inquiry in COAL AGE, Oct. 3, p. 563, where it is calculated that a consumption of 4.5 lb. of bituminous coal per horsepower per hour, will evaporate $34.5 \div 4.5 =$ say $7\frac{1}{2}$ lb. of water, from and at 212 deg. F. The rate of evaporation per pound of coal consumed is practically the same in each of these cases, making some allowance for difference in the performance of the two boilers used and the range of evaporation from the temperature of the feed water to that of the steam, which is different in the two cases.

I fail to understand, however, the calculation made in the other journal to ascertain the *efficiency* of the evaporation, which is there found to be 10.2 per cent. This seems to me to be a very low efficiency, in boiler practice. Will you kindly state what is meant by boiler efficiency, and what percentage of efficiency should be obtained in ordinary boiler practice, using cylindrical, tubular or flue boilers, such as are in common use at a large majority of the bituminous coal mines in this country.

W. L. A.

Pittsburgh, Penn.

The first portion of the statement to which correspondent refers is wholly unintelligible as it reads and the calculation wrong. As a consequence, the calculated efficiency (10.2 per cent.) is absurdly low. At normal atmospheric pressure (sea level), water is certainly converted into steam at 212 deg. F.; and the calorific power of the coal consumed may be taken at 14,500 B.t.u. In these respects, the above statement is correct.

But, taking the case assumed by the writer of the article in question: namely, the evaporation of water from a feed-water temperature of 100 deg. F., to steam at 70 lb. gage, the heat required per pound of water evaporated, as taken from steam tables, is (Kent) 1183.4 — 67.97 = 1115.43 B.t.u. per lb. On this basis, the evaporation of water per pound of coal is $14,500 \div 1115.43 = 13$ lb., nearly, instead of 68.4 lb. Then, assuming, as stated, an evaporation of 7 lb. of water per pound of coal burned, the efficiency of the boiler is $7 \times 100 \div 13 = 53.8$ per cent., instead of 10.2 per cent.

It may be remarked, in passing, that it is a very poor boiler and poor coal that will yield an efficiency less than 50 per cent. An average boiler efficiency may be taken

as ranging, in practice, from 65 to 70 per cent.; while many up-to-date boilers frequently yield an efficiency as high as 80 per cent.

By boiler efficiency is generally meant the ratio of the heat units in the steam generated, to the heat value of the coal consumed. According to the character of the coal consumed, and the type of boiler used, and the adaptation of the fuel burned to that particular type of boiler, the consumption of coal will vary from, say 10 lb. to 2.5 or 3 lb. per hp. per hr. In coal-mining practice, employing cylindrical, flue, or tubular boilers, it is fair to assume a consumption of 4.5 lb. of ordinarily good bituminous coal, per horsepower per hour, and an evaporation of 7.5 lb. of water, from and at 212 deg. F., per pound of coal burned.

Now, taking the latent heat of steam, at atmospheric pressure (sea level), as 970.4 B.t.u., and the heat value of the coal as say 14,000 B.t.u. per lb., gives the theoretical evaporation, from and at 212 deg. F., $14,000 \div 970.4 = 14.4$ lb. of water, per pound of coal burned. Under these conditions, the boiler efficiency is $7.5 \times 100 \div 14.4 = 52$ per cent.

In the article, to which correspondent has referred, it is further calculated that the generation of steam at a gage pressure of 80 lb. will require 14.2 per cent. additional coal, per horsepower per hour, which is far in excess of the truth. The latest steam tables, now generally adopted, show a difference of only 2 B.t.u. in the steam, at 70 lb. and 80 lb., respectively, at sea level. Since the total heat in the steam above 100 deg. F., at 70 lb. gage (sea level), is 1115.43 B.t.u., a difference of 2 B.t.u. when generating steam at 80 lb. gage, would require less than 0.2 per cent. additional fuel, instead of 14.2 per cent.

It is unfortunate that an article of this character should come so wide of the mark, in dealing with matters of prime importance in coal mining. This is all the more regrettable, because the journal in question assumes that it "is frequently required to correct mistakes in other coal journals, which if not corrected would lead to the impression at home and abroad that *all* were unreliable in their technology."

✕

Sealing Off a Gob Fire

When sealing off an abandoned section of a mine where the slow combustion of the waste coal and slack thrown into the gob has started a fire, where should the first stopping be built; at the intake end or at the return end of the section, assuming gas is generated and considerable firedamp has accumulated within the section?

RALPH BUTLER, Mine Boss,
Keystone Mine.

Shelburn, Ind.

In answer to this question, we cannot do better than to refer to the excellent discussion of the question in COAL AGE, Vol. 1, especially, pp. 617-18. The conclusion was that conditions alone could determine the order of building the stoppings.

Examination Questions

Hoisting Engineers' Examination Held at Terre Haute, Ind., Sept. 10, 1914

Ques.—Name the essential qualifications of a hoisting engineer, as to character, habits, education and experience.

Ans.—He should be honest, straightforward and conscientious in the performance of his duties. He should be temperate and industrious in his habits; painstaking and quick to observe every detail and to respond to any call or signal. He should be able to speak, read and write the English language; and should have a fair education in the rudiments of arithmetic and mechanics. He should be thoroughly familiar with the principles of steam and its generation. He should be fully acquainted with the construction of the steam engine and experienced in its operation.

An engineer should also be able to clean and fire boilers, in case of need; and to make any necessary repairs that may be required in his engine, and set or regulate the valves so as to produce the highest efficiency and best working conditions. This knowledge should be gained by experience in the successful operation of an engine, before an engineer is intrusted with the work of hoisting men.

Ques.—Define clearly the duties of a hoisting engineer.

Ans.—The engineer should be on hand a sufficient time before taking charge of his engine to examine every part and observe carefully its operation. In his spare moments, he should examine carefully and ascertain the condition of all brakes, bolts and other fastenings; replenish the oil cups, and oil and wipe all journals and other bearings. It is the duty of every hoisting engineer to study his engine and acquaint himself with any eccentricities of its operation. He must have a thorough knowledge of the signal code and system and must test the latter, from time to time, to make sure that it is in good working condition. He must never authorize or permit anyone to handle an engine in his charge, during his temporary absence from the engine room; but must hold himself personally responsible for the safe operation of his engine throughout the shift. He must give his entire attention to the care and operation of his engine while on duty.

Ques.—(a) What pipe fittings, valves and other attachments are used in setting up and connecting a boiler and engine? (b) What kind of fittings are necessary to make a boiler as safe as possible, so far as the fittings are concerned?

Ans.—(a) The kind of boiler fittings will depend much on the type of boiler in use; but, in a general way, all boilers are fitted with steam pipes, safety valves, steam gages and water gages or try-cocks for determining the water level in the boiler. Many boilers are fitted with steam domes, but more modern types are equipped with dry-pipes, baffling plates or steam separators for separating the water from the steam as it leaves the boiler or before

it enters the cylinder of the engine. Besides these fittings, there are the necessary feed pipes, feed pumps, feed-water heaters, fusible plugs, check valves, blowoff valves, mud drums and manholes for cleaning the boiler.

(b) The usual fittings required for the safe operation of the boiler are the safety valve, fusible plugs, steam and water gages or try-cocks, and the blowoff valves and mud drums.

Ques.—(a) What is a blister on a boiler, and how is it produced? (b) Are cracks and blisters liable to occur in the best plate iron and steel?

Ans.—A blister is a slight wart or swelling produced in a boiler plate by the overheating of the iron, at a point where the latter is unprotected by the water, owing to the formation of scale, or low water in the boiler, or excessive or ununiform firing.

(b) Without due care to prevent the water running low in a boiler, and without proper care in firing; or if scale is permitted to form on the inside of the shell, the boiler plates exposed to the fire are liable to be blistered, regardless of the quality of the iron or steel of the boiler plates.

Ques.—(a) What causes expansion? (b) In what direction is expansion greatest? Give reason for your answer.

Ans.—(a) Expansion is caused by heat; or, in the case of gases, is the result of a reduction of pressure. The heat absorbed by a body drives the molecules of matter farther apart.

(b) Expansion takes place in all directions; but, in a solid body, the expansion is greatest in the direction of its greatest dimension, because in that direction there is the greatest molecular movement.

Ques.—How would you proceed to clean a boiler?

Ans.—To avoid the undue accumulation of sediment in a boiler, it is a common practice among engineers to partially blow off the boiler while it is under steam. When doing this, however, it is important to observe that there is plenty of water in the boiler before opening the blowoff valve. This valve should be opened gradually and when the pressure in the boiler is not too high. The fire should be banked and the pressure allowed to fall to one-third or one-fourth of the normal working pressure; and the valve must be again closed before the water level can fall low enough to expose the tubes of the boiler.

In order to effect a more perfect removal of the sediment, or if it is necessary to remove scale from a boiler, the latter must be completely blown off; but this always results in the hardening of any scale that has formed within the boiler, owing to its being dried quickly by the heat of the boiler after the water has been removed. To avoid this result, it is better to let the boiler go out of service and cool down before drawing off the water. The scale is then more readily removed than when it is dry and hard. In scraping a boiler to remove the scale, care must be taken not to injure the plates, and all joints must be carefully examined to ascertain their condition. All stay-rods, bolts and braces must likewise be carefully examined and tested.

Coal and Coke News

Washington, D. C.

No decisive action has as yet been obtained with reference to the Alaska coal lands leasing bill. It is, however, asserted that the bill will be finally disposed of before the adjournment of Congress. The latter event now appears likely to occur not later than Oct. 17, the leaders having lately made exceptional efforts to arrange a plan that would enable Congress to get away sooner than had been anticipated some time ago, when it seemed as if the session might be so extended as to run into and merge with the new session, which opens, in the natural course of things, at the beginning of December.

Should the Alaska bill be adopted, as is now generally expected, the program as affecting the territory of Alaska will be deemed to be complete, and progress will at once be undertaken in applying the comprehensive system of legislation which will have been placed on the statute books for the benefit of the territory.

The construction of the Alaska railroad, which was provided for some time ago by Congress, will be pushed, and it may be expected that government efforts to develop the coal resources of the territory will become especially active. This is with a view to securing a better and cheaper supply of fuel for the Pacific coast, and incidentally of furnishing the navy with the resources of fuel which it is believed by experts to require in order that it may be strategically in a better position for the future.

Heavy Commodities Should Pay Their Share

The nearer approach of the hearings on the renewed 5 per cent. rate case indicates a probability that the advocates of the side of the roads will endeavor to make good their contention that the heavy commodities which the Interstate Commerce Commission exempted from the operation of the higher rates in the former opinion should be allowed to be included in any advance that may be granted.

Coal representatives will do their utmost to prevent the admission of the heavier products to the class of commodities which may be subjected to the advance, and it is now thought that a reargument, at least to some extent, to show why the advance should not apply to these articles, may be necessary.

It will be contended by opponents, according to current expectations, that not a few of these industries are likely to profit from the war demand and to be able to exact higher prices for export and probably in the domestic trade as well. On the strength of this, it will be urged that they ought to be made to bear their share of the work of supplying the increased income needed by the roads. It is still believed that the commission will, however, be likely to adhere to its former position in the matter.

HARRISBURGH, PENN.

The frequency of first-aid contests among the miners, suggests the wide scope of improvement that has been going on in recent years. The encouragement of first-aid work was nothing more than was to be expected from the coal companies. Conditions are far different from what they were some years ago when miners seriously injured were given only the most inexpert attention and suffered the worst of physical agony while they were conveyed many miles to the nearest hospital, and at a time when hospitals were few and far apart.

There is no doubt that the crude methods then in vogue resulted in the death of many miners whose lives could have been saved by prompt and expert attention of the kind now provided at all of the mines. From a small beginning the system has been developed until the first-aid corps actually take the place of the doctor so far as efficient preliminary aid is concerned.

Commendable interest has been shown in other ways. The conveniences established at some of the collieries are a real benefit to the employees. The schools supported by some of the companies for imparting technical instructions in mining and in popular branches are not as universally popular as the companies would like to see them, but in some districts they are an unqualified success.

Some coal companies have spent large sums of money in

establishing playgrounds and indoor and outdoor recreation centers, all voluntarily. In the report of the celebration of the Susquehanna and Mineral R.R. coal mining companies, is a statement from Morris Williams, president of the companies, advocating the enactment of a workman's compensation law and casting a shameful reflection upon the Pennsylvania legislature for its past neglect.

There will always be criticism and dissatisfaction among the employees, but over and above the complaint is the fact that the employers have done and are doing much for the welfare of the men who toil underground.

Big Production, Little Trouble

The September production of anthracite coal was the largest of any September in the history of the industry. Official figures of the Bureau of Anthracite Statistics, to be made public shortly will show that the September output was approximately 6,000,000 tons. The previous record for September shipments, made in 1912, was 5,876,496 tons.

In the anthracite field the labor situation is declared to be quieter than it has been for years. There have been one or two instances of local troubles, generally due, it is stated, to some newly elected leader and not sanctioned by the district officials of the United Mine Workers of America. Many of the large producing companies report they have had no trouble for several months.

PENNSYLVANIA

Anthracite

Pottsville—It has been announced by the Philadelphia & Reading Coal & Iron Co. that there will be no further shut downs of the mines on weekdays, except on church and legal holidays. It is stated that the demand for all domestic sizes of coal is heavy.

Seranton—Mitchell Day, Oct. 29, will be observed here with a big parade, to be participated in by mine workers of the city and vicinity. This was the unanimous vote of representatives of 25 locals in a convention recently held here.

Sugar Notch—No. 9 colliery, Lehigh & Wilkes-Barre Coal Co., which has been closed for the past four months, following a cavein which allowed the water of a pond to flood the workings, resumed operations on Oct. 1. More than 700 men and boys are employed at the colliery.

Plymouth—The Department of Education of Pennsylvania has notified the School Board that the state will share in the expense of successfully operating vocational schools in the borough, to the extent of paying two-thirds of all expenses. A school in mining suitable to prepare applicants for miners' certificates, mine foremen's and assistant mine foremen's certificates, etc., will be opened about Oct. 14.

Nanticoke—The Truesdale colliery, owned and operated by the Delaware, Lackawanna & Western R.R. Co., during the month of September mined, prepared and shipped to market 107,065 tons, which for this colliery is an increase of 200 tons over any previous month. The mines worked 24 nine-hour days, which makes the average tons handled 4668 every nine working hours. The officials and 1900 men and boys employed at the Truesdale have just reason to feel proud of the new record.

Wilkes-Barre—Striking miners at the Dorrance colliery of the Lehigh Valley Coal Co., who refused to work on Sept. 16, on the grounds that they were being unjustly dealt with in regard to the amount of topping required on each car, returned to work on Oct. 1, and the matter will be presented to the company officials by the grievance committee within a few days. The officials since the inception of the strike steadfastly refused to consider the complaint of the men until they would return to work and present the grievance in the regular manner which is now being done.

Hudson—Fire of unknown origin recently completely destroyed the engine house at the Delaware colliery of the Delaware & Hudson Co. The fire was not discovered until it had gained great headway, but was soon overcome by the work of the volunteer firemen. The amount of damage has not been made known.

Bituminous

Pittsburgh—Announcement was recently made that salaried employees of the Pittsburgh Coal Co. not included in the wage agreement with the United Mine Workers of America or other labor unions would suffer a reduction of 10 per cent. in wages. The order was so worded as to apply to employees receiving \$100 per month or more.

A long continued period of dry weather has interfered with coal operations in the neighborhood of Pittsburgh. Many of the mountain streams have dried up and mines and quarries have been severely handicapped. Some coal mines have been obliged to shut down, as the price of coal is so low as not to justify the hauling of water.

Jerome—New coal operations are to be located approximately a quarter of a mile below the plant of the Jenners-Quemahoning Coal Co. For the past six weeks, work has been progressing on the construction of a side track and the driving of the slope. The C Prime bed of coal will be worked. John Gibson, Jr., is the manager and owner of the new operation.

Connellsville—Much interest has been manifested lately in an order granted by Judge J. Q. Van Swearingen whereby the Colonial Trust Co. was granted a judgment against the Isabella-Connellsville Coke Co. for \$7,043,796. When the court convened, the attorneys representing the plaintiff company presented a petition to the court, asking that judgment in the amount named be given against the defendant on account of failure to make an appearance.

The total production of coke for September showed one of the greatest curtailments since the beginning of the year. The month's record showed a total of 1,009,741 tons, as compared with 1,310,333 tons for August, or a loss of 300,000 tons for the month.

Lilly—The first pay of the miners at this place since the first week in April was that of Sept. 26, when the men received about \$14,000. Labor troubles have now been adjusted and the condition of the market promises steady employment and good times in Lilly for some months ahead.

Church Hill—The tippie of the Dutch Hill mine burned on Oct. 2. The mine had been sold recently to the Monterey Coal Co. The loss will be about \$3000.

The Hillville mine in the Allegheny Valley, which was involved in the late failure of Frank Williams & Co., of Buffalo, has been leased by the receivers, G. B. Bassett, Jr., of Pittsburgh, taking the position of sales agent. The mine has a capacity of 500 tons daily.

WEST VIRGINIA

Grafton—A bed of the well known Red Stone coal is being opened at Pyrconnel. The coal is found to be of a quality superior even to the Pittsburgh coal.

Beekley—At the instance of Deputy Mine Inspector L. B. Holiday, W. S. Fink, a mine formen at Sprague, was recently fined \$50 for violating Sect. 10 of the State Mining Law, which provides that breakthroughs shall be driven at intervals of 80 ft. along the mine entry.

Charleston—The coal market is now so restricted that many operators along the Kanawha River are experiencing difficulty in disposing of their product. In some instances, slack is being sold as low as 10c. a ton. At another place, the slack is being dumped on the ground at a cost of 10c. per ton, and the lump and larger sizes only sold.

According to Governor Hatfield, the workman's compensation act of West Virginia is working satisfactorily. It is costing the state but 5 per cent. of the premiums collected for administration, has a surplus of about one-half of the amounts paid in, and has taken care of 16,500 claims during its first year in operation. Under the operation of the law 174 widows, 288 children, 38 dependent parents and 63 disabled workmen are being cared for by the state.

Wheeling—The Parrs Run coal mine, located about a mile from Moundsville, was recently sold to a company of Ohio coal men, headed by H. E. Loomis, of Cleveland. The property includes about 1200 acres of coal land and a modern mine which is in operation. This mine is a comparatively new one and employs about 100 men. It is understood that the new owners contemplate making extensive improvements.

Thomas—Superintendent A. Beveridge, of the Davis Coal & Coke Co., at Coalton, W. Va., was recently wounded in an attempted hold-up for the purpose of securing \$4100 in miners' pay envelopes. Mr. Beveridge was making his customary trip from the Thomas office with money to pay off the employees at mine No. 41. He had proceeded about half his journey when he was fired on from ambush, his horse receiving several shot in the neck, and he himself being struck in the arm. The horse bolted, carrying him in safety to mine No. 41.

Huntington—A friendly suit of rather unusual nature will soon be filed by the United States district attorney, growing out of the recent Glen Alum tragedy, when the payroll was robbed and several men were killed. The money was in a mail pouch, but was recovered from the robbers after it had been taken. The Government could not identify it, and will therefore sue to recover from the sheriff, who has the money, an amount equal to that found on the dead bandits. This method of settling the difficulty was the suggestion of the sheriff himself.

ALABAMA

Montgomery—No decision has yet been made by the Alabama Railroad Commission regarding the proposed increased freight rates on coal from the Birmingham district. The case has been on trial for the past two weeks, with practically every railroad and the principal coal operators as witnesses, and it is expected that a verdict will be given by the 10th of the month.

KENTUCKY

Louisville—The Eastern Kentucky mine operators are rather pleased over the showing made in the recent prohibition elections in which, in 9 out of 15 counties, the "dry" element voted saloons out altogether. The operators are pro-prohibition because of the higher standards possible in the mining communities when no liquor is permitted to be sold. Probably the direct effect is felt more in Bell County, where the remaining saloons in the Middlesboro section were voted out, so far as the mines are concerned.

Cannel City—The Kentucky Block Cannel Coal Co. has reopened its mine No. 6 after it had been shut down for two years. The mine is a mile and a half from the central-power plant and the coal, containing about 50 per cent. of volatile material, is shot from the solid without being undercut.

Whitesburg—R. T. Peters has begun a coal operation at Viper, on the Louisville & Nashville, near the Letcher-Perry line, and announces that he will begin shipping coal in the next few days. He is an experienced operator and expects to develop a mine that will give employment to several hundred men.

OHIO

Coshocton—The directors of the Ohio Cannel Coal Co. are arranging to develop a large tract of coal land in Bedford Township, Coshocton County. S. C. Priest will be in charge of the development.

INDIANA

Petersburg—D. J. Mackey has sold the Hartwell mines to the Mackey Coal Co., of Evansville, Ind., for \$75,000. This includes four miles of railroad, two mines, 2240 acres of coal land, and the town of Hartwell, with 70 miner's houses.

A month's shutdown of the S. W. Little coal mines, at Little, near here, is announced while repairs and improvements are being made in the mines. For the last several months these mines have not been running more than two days a week. They employ 400 men during normal seasons.

Terre Haute—Members of the 150 locals of the Indiana Mine Workers have received nomination blanks, preparatory to the biennial election of officers. Each local may nominate one candidate for each of the offices, the election, under the Australian system, to be held the second week in December. Nominations must be in Oct. 25 and nominees have a few days in which to signify whether they desire to accept the nomination and become candidates.

Brazil—Two new mines are to be sunk south of Knightsville, the Crawford Coal Co. putting down one of them, and the names of the men behind the other mine not yet being made public. It is reported the Miami Coal Co. will sink a mine at Ehrmandale and that a coal-stripping pit will be established near the site of the old Kokomo mine. There is a large body of block coal that can be put on cars by a steam shovel, with the handling of only 10 to 12 ft. of dirt, it is said.

ILLINOIS

Edwardsville—At the receivers sale here on Oct 3, Thomas T. Brewster, general manager of the Mt. Olive & Staunton Mining Co. of St. Louis, purchased the property of the De Camp Coal Co. at the village of De Camp, 16 miles north of here. His bid was \$5000. The property according to experts could not be duplicated for less than \$100,000. There is a bond issue of \$90,000 against the property and unsecured claims of about \$15,000. The mines have been in the hands of the receiver since Dec. 6, 1913. The sale must be approved by the Madison County Court.

Duquoin—The Majestic mine, near here, was badly wrecked by an explosion on Oct. 1. The explosion occurred shortly after the shot firers had finished their work and left the mine, and only one person was underground at the time, a member of the night shift, as far as is known. It is reported that it will take some days to find out the extent of the damage to the inner workings of the mine, and at this time it is unknown whether the explosion was caused by powder or gas.

Hallidayboro—The mine of the Muddy Valley Mining & Manufacturing Co. here, belonging to the W. P. Halliday estate at Cairo, and consisting of 5700 acres of coal lands, with surface, with all the mine buildings and properties and several farms, was sold to a syndicate composed of several West Virginia men and one investor from Pennsylvania, by S. J. Burkitt, of Mowequa, Ill. Thirty-six residences are included in the sale, which compose most of the buildings of the town of Hallidayboro. These holdings have been a part of the Halliday estate for a period of about 30 years.

Belleville—In the Circuit Court here a jury returned a verdict of \$10,000 against Donk Bros. Coal & Coke Co. in favor of Pete Ragaina, who was injured in a premature explosion while employed as a shot firer.

East St. Louis—The rumor, reporting that the Prairie mine of the Aid Coal Co. of St. Louis would likely be abandoned on account of squeezes, is denied by officers of the company, who state that the mine is in shape to operate at once and can produce 2000 tons per day. They state that the mine has not had any squeezes in a period of about two years.

Peoria—The Wolschlag mine, between Hollis and Bartonville, was recently reopened. The upper works of this operation were destroyed by fire last summer, but have been entirely rebuilt. They are now said to be fireproof in every way, being constructed of steel and concrete. Electric power is used in place of steam.

Canton—It is generally believed that the old Black Hawk mine No. 1 will soon be reopened. This operation was opened first about 20 years ago, and worked well until about four or five years ago. For the last six months the company has had the engines at work pumping out the water, and for two weeks, gangs of men have been cleaning up the débris.

NORTH DAKOTA

Mandan—Farmers in this vicinity are making search for an 8-ft. bed of coal which is said to have been discovered by members of a government mineral survey party. One of the government crew said that the coal bed is the best in western North Dakota, but he was under orders not to reveal its whereabouts.

UTAH

Storrs—One of the five boilers in the steam power plant of the Spring Cañon Coal Co. at this place exploded on Sept. 28, killing two men and seriously injuring three others; also putting the power plant and mine out of commission for some days. It is said that the failure of this boiler was due to a faulty patch on the boiler shell. The boiler itself was hurled about 200 yds., the building in which it was housed was totally demolished, and one of the other five boilers was badly injured, while the rest were put out of commission.

PERSONALS

C. L. Earnest has resigned his position as cashier of the Northfork National Bank to accept the general managership of the Fiat Rock Coal Co., of Bluefield, W. Va.

Jas. A. Richards was recently appointed District Inspector of Mines for the Calgary District of Alberta. His address accordingly changed from Royal View, Alberta, to Calgary.

A. H. Wood, of Petros, Tenn., president of the Petros Coal Mining Co., and consulting engineer for the Turley Coal Co., at Turley, Tenn., is organizing a company to open a mine in the Harlan field of Kentucky, and expects to start development at an early date.

John Stannis, of Mt. Braddock, Penn., was recently presented by the miners of that place with a gold watch appropriately engraved. Mr. Stannis resigned to accept the position of assistant mine foreman at the Phillips works of the H. C. Frick Coke Co. Mrs. Stannis was also presented with a silver tea set.

J. M. Page, of Lafollette, Tenn., superintendent of Rex Mine No. 1, of the Lafollette Coal, Iron & Ry. Co., has resigned.

G. Walters, superintendent of Gem mine, at Peabody, has succeeded Mr. Page, and Joseph E. Hendren, mine foreman at the Gem mine, has been promoted to the position of superintendent of that plant.

C. E. Sharpless, general manager of the Nanty Glo Coal Co., the Dixon Coal Co., the Atlantic Coal Co., and the Irona Coal Co., all operated by allied interests in Pennsylvania and West Virginia, and formerly for several years in the employ of the Berwind-White Coal Mining Co., at Windber, Penn., recently changed his residence and address from Cresson, Penn., to Ebensburg. This change in location did not involve any alteration in either duties or positions filled.

CONSTRUCTION NEWS

Chattanooga, Tenn.—Kerby & Jones were recently awarded the contract by the Chattanooga Gas & Coal Products Co. for grading the site of the coke-oven plant to be erected in Alton Park. The contract includes all grading for foundations, buildings, ovens, and for two miles of railway. The contractors immediately made bond to have the entire work completed by Nov. 1.

Portsmouth, Ohio—Work has been started on the Chesapeake & Ohio spur line from Portsmouth to Columbus, which will parallel the N. & W. between the same points. The construction of a bridge across the Ohio at Portsmouth, at a cost of \$3,000,000, is a part of the work to be handled. The building of the new line is the result of the court decision regarding the handling of Chesapeake & Ohio traffic over the N. & W. line, which had been for years regarded as practically a branch of the Chesapeake & Ohio.

Toledo, Ohio—It is stated on what appears to be reliable authority that the receivers of the Cincinnati, Hamilton & Dayton Ry. Co. expect to proceed at an early date with the enlargement of the company's docks and the purchase of new coal-hoisting machinery for use in Toledo. Enlargement of the Cincinnati, Hamilton & Dayton docks above the Fassett street bridge is considered a necessity because of the remarkable increase in the amount of lake coal handled there. The tonnage of coal handled at the dock this year will be the largest in the history of the road. It already exceeds last season's record by 600,000 tons.

Pittsburgh, Penn.—With the opening of three new mining plants by the Pittsburgh Coal Co., three model mining towns will be brought into existence, and approximately 3000 men will be given employment. This work is now being pushed with all possible speed, all of the new plants being on the Montour R.R. The first of the new plants will be three miles south of McDonald; the second, adjacent to Venice, and the third near Hill Station. It is expected that the houses in each town will be ready for occupancy within a short time. A 75-room hotel for miners will be built in each of the towns also. Playgrounds and ballgrounds will be constructed and equipped in the most modern way while the distinct novelty of the new houses will be out-door bath houses. It is believed that this will enable the miners to leave the grime, which is ordinarily carried into the house, behind in the outside bath house where the change of clothes is made.

NEW INCORPORATIONS

Gadsden, Ala.—The Brown Coal Co., with a capital stock of \$2000, has been incorporated. The company will develop a tract of coal land in Blount County, not far from Oneonta. Watt T. Brown, of Ragland, Ala., is president.

Columbus, Ohio—The Whyel Coal Co., of Columbus, has been organized with a capitalization of \$10,000, and will engage in coal mining. The incorporators are George Whyel, C. M. Crooks, F. S. Crooks, R. J. O'Dell and W. T. Gano.

Clarksburg, W. Va.—The J. E. Long Coal Co. has been incorporated with a capitalization of \$10,000, and will engage in mining. J. E. Long, of Philadelphia, is the head of the company. D. D. Britt and others, of Clarksburg, being interested.

Birmingham, Ala.—The Wadsworth-Cahaba Coal Co. has been incorporated with a capital stock of \$5000. W. C. Beck is president; L. E. Patton, vice-president and treasurer, and Paul Lanier, secretary. The office is 1107-8 American Trust & Savings Bank Building. The new company has taken over a mine of the Wadsworth Red Ash Coal Co., at Helena.

**STATEMENT OF THE OWNERSHIP, MANAGEMENT
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The balance of the stock issued (less than 1% each) is owned by 70 employees, 3 ex-employees, and 14 others who are wives, daughters or relatives of employees.

Known bondholders, mortgagees, and other security holders holding 1 per cent. or more of total amount of bonds, mortgages or other securities. Mortgage on building held by Dime Savings Bank, Brooklyn, N. Y.

C. W. Dibble, Vice-President,
HILL PUBLISHING COMPANY.

Sworn to and subscribed before me this 30th day of September, 1914.

RICHARD L. MURPHY,
Notary Public.
(My commission expires March 30, 1915.)

INDUSTRIAL NEWS

Columbus, Ohio—Authority has been granted to the Little Miami Railway Co. to issue \$306,500 additional stock to compensate the Pennsylvania system for improvements on the line.

Central City, Penn.—The completion of the electric-power installation for the operation of the Berwind-White McGregor mine near here is being pushed. The Berwind-White company is also having more new houses erected for the use of its miners at the new plant.

St John's, Newfoundland—The wreck of the Dominion Coal Co.'s collier "Cacouna" and the safety of her crew were recently reported here. The "Cacouna" from St. Johns for Sydney, Nova Scotia, went ashore at Ferryland between this port and Cape Race. The vessel was built at Newcastle in 1884, and had a gross tonnage of 1451 tons, and is believed to be a total loss.

Buffalo, N. Y.—A Buffalo furnace interest recently closed a contract for 10,000 tons of Connellsville furnace coke for shipment during the month of October at \$1.65 per ton. Coke is reported as offered at this price for delivery during this month, although dealers are not willing to accept less than \$1.75 for shipment during the balance of the year and some are asking \$1.85.

New Orleans, La.—During the past few months, self propelled steel barges have been running between the Alabama coalfields and New Orleans, thus beginning the utilization of a great system of inland waterways. In the past 20 years, the government has spent \$8,000,000 in making the waters of the Tombigbee, Warrior and Black Rivers navigable for vessels of 6 ft. draft to connect the Alabama coalfields with tidewater.

Philadelphia, Penn.—It is said that exports of bituminous coal to Mediterranean countries has continued to increase since war in Europe was declared and are now far more than double their volume some weeks ago. On the other hand, exports to South America have not increased as rapidly. It is believed, however, that eventually exports to South American countries will prove a tremendous asset to the United States.

Beech Creek, W. Va.—A new and extensive coal operation is being developed in Boone County, on Beech Creek, and it is expected that coal will be taken out in about two months. The new undertaking is that of the Boone County Coal Corporation, J. C. Blair, manager. This firm owns large tracts of land in Boone County and several mines have been operated on lease on its holdings. As soon as the spur track to the mine is completed, work will be begun on the tippie and the town.

Birmingham, Ala.—Representatives of coal-producing companies in the Birmingham district are preparing to go to Panama and South America, and it is expected shortly that

a movement will be started that will require many hundred thousand tons of coal to be shipped through Mobile, New Orleans and Pensacola. Brokers in Mobile have notified connections in Birmingham that they are in position to handle any amount of coal, and that the harbor facilities there are in good shape and ready for any and all emergencies.

Cincinnati, Ohio—The Chesapeake & Ohio has filed here its appeal from the judgment against it in favor of the estate of Thomas G. McKell in the sum of \$125,000, in the celebrated case which has been pending since 1902. The original suit was for \$3,500,000, alleged to be due as damages for the failure of the railway company to carry out the terms of an agreement said to bind it to purchase all the coal mined by McKell in his West Virginia properties. The judgment appealed from was rendered in the third trial of the case.

Harrisburg, Ill.—The Wasson Coal Co. is rapidly becoming a prime factor in the coal production of Illinois. At present, new mines are being opened at Harrisburg, Ill., and Vincennes, Ind. These are of modern construction operated with electrical equipment, such as coal cutters, locomotives and hoisting, pumping and ventilating machinery. Orders for 21 "Type C" locomotives have been recently placed with the Morgan-Gardner Electric Co., this being one of the largest orders for mine locomotives ever placed in Illinois.

Columbus, Ohio—Unless the Hocking Valley Ry. Co. wins its contentions in the Ohio Supreme Court, it will be compelled to pay a penalty of \$1000 per day for failure to institute electric service for passengers on the Wellston and Jackson Belt Line. A suit to that effect has been filed by the Ohio Public Utilities Commission in the Jackson courts. The question hinges on the authority of the Commission to designate the kind of service a utility shall render to the public as the Hocking Valley company proposed to start steam service.

Washington, D. C.—The U. S. Bureau of Mines in coöperation with the U. S. Geological Survey, has undertaken comprehensive investigations pertaining to the problem of mine caves and surface support. The immediate work of the mining engineers and geologists will comprise detail studies of the extensive open cut and underground mining operations in southwestern New Mexico. The field investigation will be conducted with special reference to earth pressures and surface subsidence in relation to geological formations and mining conditions, also in relation to the equipment and efficiencies of the large mechanical installations in operation there.

Washington, D. C.—An interesting new exhibit has just been placed in the U. S. National Museum by the Division of Mineral Technology, consisting of a model of a complete by-product coke plant. This model constructed in the Museum shops is in the form of a relief panel 28 ft. long and 7 ft. high on a scale of 1/30 actual size, with the different processes following in sequence. In connection with this model there is an exhibit showing the development of the coke industry from the earliest crude form of merely burning coal in the open to the present highly complex system of distillation without combustion, preserving and utilizing all the by-products.

Newport News, Va.—Shipments of steam coal from Hampton Roads ports during the month of September were greater than ever before in any single month. They reached the aggregate of 1,271,772 tons, or at the rate of more than 15,000,000 tons yearly. The Norfolk & Western R.R. put 690,348 tons over its piers. The Chesapeake & Ohio followed with 331,098 tons, and the Virginian dumped 250,335 tons. Of the total amount shipped from Hampton Roads, about 300,000 tons, or one-fourth, was exported to foreign countries, South America, the West Indies, Italy and Greece. It is believed that during the past month, Hampton Roads became the greatest coal port in the world, passing Cardiff, which heretofore had lead in coal exports. It is believed also that Hampton Roads will keep its lead and that the coal trade there will become far greater than it is at present.

Cincinnati, Ohio—Opposition has developed to the issue of receivers' certificates of the Cincinnati, Hamilton & Dayton to the amount of nearly \$3,000,000 for new rolling stock, in consequence of which receivers Judson Harmon and Rufus Smith have decided to delay the matter until a more opportune time. The Central Trust Co., of New York, indicated its intention of formally protesting to the court against the granting of the issue, on the ground that it would imperil the security of liens held by the company securing bonds for which it is the trustee. The high rate of interest which would have to be paid at present is felt by the receivers to warrant the postponement of the application until a later date. While it is felt that it would be possible to secure the desired rolling stock at very favorable prices, on account of existing conditions, the financial situation would involve excessive interest rates, and nullify this advantage.

Coal Trade Reviews

General Review

Anthracite collieries continue on a full time basis but the demand has slowed up temporarily. Considerable bituminous coal available and current business generally discouraging. Large preponderance of finer sizes still demoralizing the interior markets. England increasing her export shipments.

The spurt in anthracite, caused by some unexpectedly cold weather, has been succeeded by a moderate slowing up in the demand, though conditions are about normal for this period of the year. The buying has only eased off for the time being, pending a return of colder weather and the opening of the fall business. But even now the mines are working up to full time, dealers and wholesalers accumulating all the possible stocks in anticipation of a heavy rush shortly. The difficulty in obtaining ready money has also been a factor tending to restrict buying.

While there is an excellent undertone in the bituminous trade, the current business continues discouraging, and it is generally felt that there will be no renewed activity until the cessation of the European war; prices are only moderately firm, and the agencies are generally short of orders. There is considerable coal at the distributing centers, but a most encouraging feature of the situation is the almost complete absence of the usual customary heavy price cutting that ordinarily marks a depressed situation. The demand for export coal has not been so great, and reports from abroad indicate that England is again resuming her shipments in this trade. Clearances at Tidewater have been fairly regular, but these do not by any means make up for the loss in the internal consumption.

The Pittsburgh market could hardly be more stagnant. All hope of any final rush in the Lake trade has been definitely abandoned, and there is scarcely any demand at all for free coal, while prices are low and exceedingly irregular; the circulars are only nominal and have been entirely abandoned on current business. It is difficult to find any improvement in bituminous coal in any direction, and none can be expected until there is a revival in general manufactures. There is more coal on track, and slack is becoming more difficult to move all the time.

The warm weather has resulted in a distinct slackening up in the domestic business in Ohio, but the production is keeping up fairly well, and the market is not notably changed. Manufacturing operations are still heavily restricted, and with a large surplus of the finer sizes, it is difficult to see how even a long stretch of cold weather will create any general activity.

There is vigorous competition in all directions in the Southern markets, but prices are fairly steady though at somewhat below the customary fall level. Unconfirmed reports of large sales in the export trade has created a hopeful feeling in some sections, but this is probably more than compensated for by the depressing effects of the European war. Prices are fairly steady, but operations are much restricted.

In the Middle Western market an unexpected slump among the high-grade coals has further accentuated the demoralization prevailing in the steam sizes. The customary fall increase in the circular has been put in effect at some points, but so far it is purely nominal. There seems to be no hopes for better prices until the colder weather creates a demand from apartment houses, and there is a more general resumption in industrial circles.

ATLANTIC SEABOARD

BOSTON

Pocahontas and New River demand is light, but no significant change in price. A better tone noted although spot market is not improved. Export inquiry irregular. Georges Creek shipments nearly normal and Pennsylvania grades steady. Stove shortage still a feature in anthracite.

Bituminous—The market on Hampton Roads coals shows no material change. The volume at the piers continues large but clearances have been fairly regular, and there is perhaps

a better tone to the situation than for two or three weeks past. Prices less than \$2.85 f.o.b. are still being made, but they are not regarded as quite so significant. The agencies are short rather than long of orders for October, but it is hoped that the advancing season and the resumption of full time in some of the mills will show results before the month is over. Shipments on contract show only a slightly better tonnage and the spot market here is conspicuous by its absence. Cargoes on consignment are being absorbed very slowly up the line, and prices for inland delivery cannot be said to be any firmer than a week ago.

Inquiry for export is spasmodic, and shippers are not counting on much more than normal business in that direction for the present. Many of the purchases made in early August have now been filled and new orders on satisfactory terms are not plentiful.

The supply of Georges Creek for this market shows a steady increase and shipments are coming forward almost as regularly as early in the season. The largest part of this tonnage is placed on contracts and there has been no variation in price.

Certain of the more favorably known Pennsylvania grades are having better demand and prices are fairly steady. Clearfields are in ample supply at Philadelphia and New York, but in spite of this there has been no marked concession in price. All-rail there is about a normal movement from all the fields.

Anthracite—The shortage of stove is still the prominent feature of current trade. All the companies have a comfortable margin of orders to work on, and on the other hand, there is no special pressure to get coal forward promptly. With stove coal the desirable size the dealers are confining their orders for the most part to the regular sources of supply, and the various independent houses are, therefore, doing rather less than usual in this territory.

Bituminous prices at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	\$0.90@1.50	\$1.25@1.65	\$1.67@1.77	
Philadelphia*	2.15@2.80	2.50@2.90	2.92@3.02	
New York*	2.40@3.10	2.80@3.20	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				\$2.80@2.85
Boston†				3.60@3.78
Providence†				3.63@3.73

* F.o.b.

† On cars.

NEW YORK

Bituminous market is still marking time pending some new developments. Anthracite slowing up moderately but about normal for this period. Mines working full time.

Bituminous—The New York soft-coal market continues dull and uninteresting, so far as new business is concerned. The stocks at Tidewater are only about normal, while there is an entire absence of demurrage coal and the higher grade fuels are rather closely held. The lack of the customary large surpluses, which usually prevail at Tidewater in time of a heavy market, is considered indicative of the excellent condition of the trade, but it is also a significant fact that the operators do not regard the outlook as favorable or they would not be holding the coal back as they are.

On the other hand, there is a decidedly optimistic feeling in trade circles, and there are indications of an excellent undertone. Except in isolated instances, mines seem to be working slightly better, and the movement on contract has picked up some. Of the leading producers, the Berwind White Co. continues the worst sufferers, their operations being curtailed down to from two to four days per week as a result of the more or less complete suspension of the big liners. It is noted, however, that the bunkering demand from the tramp steamers has been unusually heavy recently.

The New York market is not notably changed, though prices are probably somewhat more steady at the former level as follows: West Virginia steam \$2.50@2.60; fair grades Pennsylvania, \$2.55@2.65; good grades of Pennsylvania, \$2.70@2.80; best Miller Pennsylvania, \$3.10@3.15; Georges Creek, \$3.15@3.25.

Anthracite—A moderate slowing up in hard coal is noted, though not of important proportions, the trade being very close to normal for this period of the year. The rather sharp spurt of a few weeks ago, caused by some unseasonable

weather, has given way under the influence of the higher temperatures prevailing over the past week, and the trade has settled down into a temporary lethargy, pending the opening up of the customary fall business. One of the features restricting a more general buying is the shortage of money.

In the larger sizes the situation of broken coal is normal as usual, the collieries just making enough of this grade to take care of the demand. Egg coal is the heaviest of any of the domestic sizes, being quoted down to fully 20c. off the circular. Stove coal continues the leader, commanding premiums in all directions, except where sold in connection with some of the heavier grades. Nut coal is normal at the circular. In the smaller sizes, pea is in good demand, though there is plenty available, while rice is moving in fairly good volume, and the buckwheats are notably off. The shipments on egg and nut coal are plentiful, but stove is coming forward very slowly. The collieries are all working full time.

The New York hard coal market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken.....	\$5.10	\$1.65@5.10	\$5.05	\$4.60@5.05
Egg.....	5.35	5.10@5.35	5.30	4.80@5.30
Stove.....	5.35	5.35@5.45	5.30	5.30@5.40
Chestnut.....	5.60	5.50@5.60	5.55	5.45@5.55
Pea.....	3.55	3.45@3.55	3.50	3.40@3.50
Buckwheat.....	2.80	2.70@2.80	2.50@2.75	2.25@2.75
Rice.....	2.30	2.10@2.30	2.00@2.25	1.50@2.25
Barley.....	1.80	1.70@1.80	1.75	1.50@1.75

PHILADELPHIA

Conditions in anthracite market still indicate an improvement. Demand well maintained. Stove leading feature. Bituminous remains inactive, with curtailed operations still in effect.

Anthracite—While the past week has not been conducive to the consumption of the coal, at the same time, there is every indication that the trade is swinging into line for the winter business. All sizes seem to be in fairly good demand, with stove the feature, and still being used as the lever for the movement of other sizes. The steam sizes still continue to bother the operators, who find themselves hard put in some cases, to move it. While the current contracts are absorbing large quantities, at the same time, their requirements will necessarily be limited until the cold weather opens up. Pea coal is essentially a domestic fuel in this market, and very few, if any, buy in larger than one- to two-ton lots. When this class of trade begins to take on coal the congestion of the small sizes is likely to disappear.

In the face of this condition, one hears of few concessions on the small sizes; perhaps 10 to 15c. per ton in occasional cases, but the operators as a whole seem to feel that the time has arrived to strictly uphold the so called circular. Chestnut is also selling off circular, but not to the ruinous extent of the last three or four months.

Prices at Tidewater rule about as follows:

	Circular	Individual
Broken.....	\$4.75	\$4.40 @ 4.50
Egg.....	5.00	5.00
Stove.....	5.00	5.00 @ 5.10
Chestnut.....	5.25	4.90 @ 5.00

Bituminous—Very little improvement was noted in this branch of the trade during the past week. While considerable coal is moving on contracts, the outlook for new business is not favorable.

BALTIMORE

Feeling of depression continues. Demand light and prices poor. Anthracite trade on household call fair.

President Willard of the Baltimore & Ohio R.R. has stated that there would be no business resumption of a general nature until after the close of the European war which agrees with the views of many of the coal men. Others, however, are still hopeful that the next few months will see a gradual resumption.

There can be no doubt about dullness in the coal fields of Pennsylvania, Maryland and West Virginia. Curtailments and complete cessations in operations are reported from a number of districts. Coal was freely offered to the trade in Pennsylvania at from 95c. to \$1 for low grades, with best grades at around \$1.30. Western Maryland had steam coals on the market around 80 and 85c., and a like figure was quoted for some West Virginia steam fuels. Gas three-quarter was plentiful around 85c., with run-of-mine at 75c. and slack offering down to 30c.

In the face of such a market there was not so much enthusiasm over the fact that export records were broken in September, as might otherwise have been the case. Italy and South America drew more heavily than usual and the export figures jumped to 123,178 tons for the month, the largest on record. Less charters are noted now, however,

and it is expected that the exports the present month will drop back around 80,000, or less.

Coastwise movement remains featureless. Vessel bottoms are more than abundant for the domestic, as well as the foreign trade.

Anthracite is reported in fair call for household purposes. Steaming coals are dull.

HAMPTON ROADS

Shipments fair but not so heavy as previous week. Prices practically stationary. Dumpings for September break all previous records. Total for the month, 1,271,772 tons.

Shipments of coal from Hampton Roads during the past week have been fair although the end of the week there was somewhat of a decline. Foreign shipments have been made to Canal Zone, Vera Cruz, Port of Spain, Rio, Curacao and Kingston with coastwise cargoes going to Boston, Bangor, Providence, Everett, and Jacksonville. The demand for export coal during the last few days has not been so brisk. This is believed to be due to the fact that England is again coming forward with coal for foreign shipment.

Prices remain practically at circular although there have been rumors that some of the small shippers are offering coal at a slight reduction from the circular. There has been a little demand during the week for nut and slack but so far as can be ascertained only a small quantity has been sold. The accumulation of cars on the various railways yards is still somewhat above normal with a fair amount of coal in transit.

All records in coal dumping over the tidewater piers were broken during the month of September when a total of 1,271,772 tons were dumped over the Lambert's Point, Sewalls Point and Newport News piers. Of the total quantity dumped 690,348 tons went over the piers of the Norfolk & Western, 331,089 tons over the Chesapeake & Ohio and 250,335 tons over the Virginia Ry. pier at Sewalls Point. As will be noted the Norfolk & Western dumped 108,924 tons more than the Chesapeake & Ohio and Virginia combined and while both the Norfolk & Western and the Chesapeake & Ohio show a decided increase over last month's figures, the Virginian shows a falling off.

COAL CHARTERS

The "Journal of Commerce" reports chartering as follows: As has been the case for some time past, trading was largely for transatlantic account, and a moderate demand continues to come from the same sources for boats for October loading. In all other trades, including West India, South America, China, Japan and Australia, freights are exceedingly scarce for either prompt or forward loading. There is a moderate supply of boats available for early delivery, but they offer sparingly at the rates indicated by charterers, owners ideas being somewhat above the basis of recent fixtures. The sailing vessel market shows no indication of improvement, either as regards the general demand or the rates bid, and only a limited general business was reported in chartering. Tonnage of various kinds is quite plentiful, and the general tendency of rates favors charterers.

Coal charters have been reported as follows:

Vessel	Nationality	From	To	Tons	Rate
Auchenblae	British	Baltimore	Cienfuegos	2500	
Aero	Norwegian	Philadelphia	Cienfuegos	1092	
Fanny C. Bowen		Philadelphia	Calais	1357	\$1.10
Courtney C. Houck		Baltimore	Tampa	611	
Isabel B. Wiley		Philadelphia	Point-a-Pitre	611	
Republic		Philadelphia	Point-a-Pitre	680	
Francis M.		Baltimore	Key West	1096	1.25
Augustus Welt		Baltimore	Mayport	1111	
Maud Palmer		Baltimore	San Juan P. R.	1485	
Henry W. Cramp		Baltimore	Mayport	1448	
Brin P. Pendleton		Philadelphia	Calais	821	
John B. Manning		Philadelphia	(to the sound)	955	0.60
Ben Nevis	British	Baltimore	Genoa	2525	

Note—Steamers are indicated by bold face type, all others being schooners.

COKE

CONNELLSVILLE

Coke market stagnant, except for sale 10,000 tons prompt furnace at about \$1.65. No inquiry. Shipments somewhat decreased.

The only activity in furnace coke for some time past was the sale about a week ago of 10,000 tons for October shipment to a Buffalo consumer, the purchase being necessitated in part by the withdrawal of Dunbar byproduct coke, now to be used locally as one of the Dunbar furnaces is being blown in. The price is believed to have been about \$1.65 at ovens. The whole coke market is utterly stagnant, consumers not evincing enough interest to develop any quotations to speak

of from producers. We quote as nominally representing the apparent market level: Prompt furnace, \$1.65; contract furnace, \$1.75; prompt foundry, \$2.25; contract foundry, \$2.25, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Sept. 26 at 247,221 tons, an increase of 3526 tons, and shipments at 248,063 tons, a decrease of 8474 tons, production and shipments about balancing.

BUFFALO

The reports from the coke trade continue unfavorable. Shippers are unable to interest consumers beyond the line of their immediate wants, so that the prices are constantly sluggish and in some grades little more than nominal. Quotations remain on the basis of \$4.25 for best 72-hr. Connellsville foundry and \$3.30 for stock coke.

BIRMINGHAM

Both furnace and foundry coke are very quiet, with no improvement in sight.

LAKE MARKETS

PITTSBURGH

Market completely stagnant and prices still more irregular, even \$1 being occasionally shaded for mine-run. Lake shipments poor. Mining at 50% of capacity.

The local coal market is about as stagnant as it could well be. There is hardly any demand for free coal, and none at all for contract. Prices are extremely irregular, and on some divisions even \$1 a ton is not minimum for mine-run. For the best Pittsburgh gas coal, however, \$1.10 would probably have to be paid, and possibly \$1.15. Slack is offered at all prices, in a few instances at less than 50c. Lake shipments have declined a trifle in the past week or two, but not much. Practically all hope has now been abandoned that there will be any spurt in shipments, as it is already near the end of the season, and the entire Lake movement is likely to show a decrease of more rather than less than 25% from the record tonnage of last season.

There begins to be considerable doubt whether any new circular prices will be announced. The old circular prices, of a year ago, have been entirely lost sight of for months when it came to naming actual quotations against inquiries, but as a matter of history they are repeated in our report: Slack, 90c.; nut and slack, \$1.05; nut, \$1.25; mine-run, \$1.30; ¾-in., \$1.40; 1¼-in., \$1.50, per ton at mine, Pittsburgh district. Mining operations are about 50% of capacity.

BUFFALO

Considerable coal on track. Slack difficult to move. Quiet all through the bituminous trade. Disposition to ship in excess of orders. Good anthracite trade in spite of warm weather.

Bituminous—There is more coal on track than is good for the trade. Several jobbers confess to large amounts of coal for which they blame the mines. The supply of slack is increasing all the time and sales are made at a sacrifice.

There does not appear to be any improvement anywhere in bituminous; the salesmen keep everybody so far overstocked that it is impossible for a really genuine demand to exist anywhere and this will doubtless continue till there is a big revival in factory work. If Europe must buy soon there should be some start in that direction, but it is all a matter of prediction so far. One difficulty with the trade is the refusal of the railroads to buy.

But in spite of these adverse conditions there are shippers and jobbers here who claim that their business is growing steadily, month by month and is larger now than it was a year ago; this would seem to indicate that there is activity somewhere. The change in the bituminous trade is mainly in slack, which goes begging everywhere. Other quotations remain on the basis of \$2.80 for Pittsburgh lump, \$2.70 for three-quarter, \$2.55 for mine-run and \$2.15 for slack. Allegheny Valley sizes are about 25c. less.

Anthracite—There is an improvement in practically everything. Egg, which was dull for sometime, is stronger and pea has moved more actively of late. Stove and chestnut are strong. While there has been a falling off in Lake shipments of late that is merely on account of the excess amount on the Upper-Lake docks. Trade is good there, but there was too much carried over from last winter.

The local anthracite trade is much better than the recent long run of warm weather would seem to warrant. Should it come really cool now the demand would increase very

rapidly. The spurt in August on account of the war has about been discounted, so that the future looks good. The rail-line trade is reported brisk.

Lake shipments for the week were 124,750 tons, for September, 428,426 tons and for the season to Oct. 1, 3,156,781 tons. The September decrease is about 20% from the same month last season and it is doubtful if there will be room enough developed on the Upper Lake docks to lessen the falling off. The amount shipped last season to October was 3,840,936 tons.

TOLEDO

Nearly a million and a half tons of coal passed through Toledo during September. Ore tonnage light. Domestic coal affected by weather conditions. Steam grades a little stronger.

The changing weather conditions have kept the coal dealers in a most uncertain position. The domestic market here is hinging entirely on the weather. The steam market is showing a little more strength but the demand has not been up to normal. The Lake movement continues fairly active and the reports from the customs office shows that 1,420,044 tons of coal passed through this port during the month of September, of which 458,896 tons were for Canadian ports. The ore tonnage was extremely light amounting to but 66,580 tons for the entire month of September. Prices as quoted on the Toledo market follows:

	Hocking Valley	Cambridge	Pomeroy	Massillon	W. Va. Splint	Pocahontas
Lump.....	.....	.....	.....	\$2.50	.....	\$2.25
Lump.....	.....	.....	.....	2.50	.....	2.25
Re-screened	.....	.....	.....	.....	.....	.....
Lump.....	\$1.70	.....	\$1.75	.....	.....	.....
Domestic	.....	.....	.....	.....	.....	.....
Lump.....	1.60	.....	1.60	.....	\$1.60	.....
1½ Lump.....	.....	\$1.40	.....	.....	.....	.....
¾ Lump.....	.....	1.20	.....	.....	.....	.....
Egg.....	1.25	.....	1.35	.....	1.15	2.25
4-in. Black	.....	.....	.....	.....	1.75	.....
Nut.....	1.15	.....	1.25	.....	.....	.....
Washed Nut	.....	.....	.....	2.50	.....	.....

COLUMBUS

Trade quiet because of the continual warm weather. Steam business is still slow while Lake trade is active. Prices unchanged.

With continued warm weather there is a distinct slackening in the domestic trade in Ohio markets. This has not affected the situation to any extent as production is keeping up fairly well, but on the whole the tone of the market is not as satisfactory as formerly. No new circular was issued Oct. 1, and it is doubtful if any change in prices will be made before Nov. 1.

The domestic demand, which has been the backbone of the trade, is quiet all along the line. Stocking up on the part of private consumers is not as active as formerly and dealers have been cancelling orders or deferring shipment. Their stocks are sufficiently large to take care of present needs. Retail prices have not suffered by the slump and cutting among dealers has not been resorted to at all.

The Lake trade is still fairly active as the demand from the Northwest continues good. Docks of the Upper Lake ports are generally free from congestion. Chartering of boats is going on actively and the Lake movement will probably continue until the close of navigation. Steam business continues dull in every particular and there is no immediate hope for improvement. Manufacturing is still slow and purchasing agents are loath to lay in surplus supplies. Much of the buying for steam purposes is on the open market although a number of steam contracts have been concluded within the past few weeks.

The market for fine coal is still weak but a number of shippers profess to see an improvement in this branch of the business. Production in Ohio fields has been fairly good under the bad conditions. Pomeroy Bend reports a normal output and the same is true of certain districts of the Hocking Valley. Jackson and Crooksville have produced about 80% of the average. All mines are idle in eastern Ohio.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Re-screened lump.....	\$1.70	\$1.75	.....
Inch and a quarter.....	1.60	1.60	\$1.50
Three-quarter inch.....	1.45	1.45	1.45
Nut.....	1.15	1.40	1.15
Mine-run.....	1.15	1.15	1.15
Nut, pea and slack.....	0.30	0.35	0.30
Coarse slack.....	0.20	0.25	0.20

CLEVELAND

With receipts of 150 cars over Sunday the Cleveland market is demoralized. Prices are off 10 to 15c. and the Lake trade is rapidly slowing down.

Hocking coals have been dumped into northern Ohio steam markets until spot prices have been forced down

10 to 15c. and though shipping prices are nominally the same as a week ago, 5 to 10c. a ton less would be acceptable for fine coal. Panhandle slack was offered recently at 45c. at the mines, \$1.45 Cleveland, with other fine coals at very nearly the same.

Lake front coal docks are going on a single day shift and by the middle of the month only one or two docks will be working day and night. A number of ships have been ordered laid up this week and by the middle of the month fully 30 vessels will be out of commission for the season. The Upper Lake docks are loaded to capacity and, even though space were found later in the season, the supplies of coal are sufficiently large to carry the dealers and trade over until next season when new coal will be available.

No. 8 field will not ship any Lake coal this season. It is now a question whether any of this coal for commercial purposes will be produced this winter. Operators are discussing Apr. 1, 1915, as the probable date for resuming mining.

In the Bergholz field two mines were closed last Saturday because the coal produced under the mine-run contract was too fine and dirty. At another mine it was necessary to fine the men for allowing too much extraneous matter to get into the coal. At a third property an attempt was made to suspend two miners because of the slate in the coal, but a strike followed and the operator was forced to take back the men.

Prices for current shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump.....	\$3.75				
Lump, 6 in.....			\$2.45		
Egg.....	3.75				
Egg, 6 in.....			2.10		
Lump, 1 1/2 in.....		2.40	2.25		
Lump, 1 in.....		2.30	2.10	2.00	2.05
Mine run.....	2.75	2.15	1.95	1.90	1.95
Slack.....	2.40	1.50	1.45@1.50	1.50	1.50

CINCINNATI

Light demand for screenings continues the main feature. Movement of the domestic grades slow though demand is good. No immediate relief in sight.

Plants operating on a curtailed basis will buy little coal until cold weather compels them to use more for heating purposes. But even cold weather will not cause the factories to open up, nor furnish more business to any industry and as the industrial depression is the principal cause of the slow steam market, some other stimulant must be looked for. Reports of reviving export trade indicate the probability of greater activity among local manufacturing plants than has been the case for some time which should help the situation materially.

The domestic movement is still good, both with the operators and the retail trade. The season is now late enough to make it easy for consumers to appreciate the closeness of cold weather, and deliveries are consequently being made in good volume. Prices for the prepared grades are normal, but this can hardly be said for screenings or any other grade of steam coal.

SOUTHERN

BIRMINGHAM

Market rather quiet. Many rumors regarding large sales, but no confirmation.

This week has brought out no decided change, either on steam or domestic coal. The local demand for steam coal is quiet, and lump coal is moving only in small quantities. There have been reports of several large sales of Alabama coal to foreign countries this past week, one of which was 1,000,000 tons to Greece, but they cannot be confirmed. Blacksmith coal is in a satisfactory condition. Sales of pig iron are light.

LOUISVILLE

Vigorous competition in all directions. Prices fairly steady though at less than the customary fall schedule. Operations restricted.

The domestic movement is holding up fairly well but the general activity is sharply reduced from what it normally is at this time of year. The effect of the war in Europe is more depressing if anything.

Salesmen are active in all sections and competition is vigorous. It was expected that some business might develop on the Eastern coast but the companies have found competition as keen there as closer at home. As a rule there has not been much slashing of prices, though these have not been advanced as much as usual this fall. Occasionally contracts are rewritten on the old basis though a number have

been bid in by new companies at lower figures. This applies to steam coals only.

In Southeastern Kentucky where most of the mines resumed full-time operations toward the close of the summer, there has been a return to the three-day a week basis again. Occasionally full time operations are the rule where operators are particularly well situated.

Block coals range widely, from \$1.75 to \$2.25 a ton, f.o.b. mines, with egg sizes at from \$1.25 to \$1.50. Nut and slack of the best grade is plentiful at from 50 to 60c. and the lower grades from 25c. down to nothing, some mines permitting it to be hauled away free. The Western Kentucky screenings are hard to sell at any price.

MIDDLE WESTERN

INDIANAPOLIS

Weather against trade and mine schedules are reduced. Screenings situation about the poorest ever known. Domestic grades moving fairly well. Some Oct. 1 advances at mines.

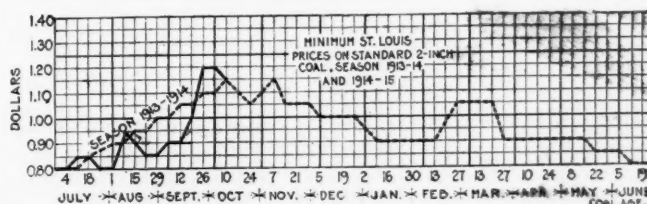
Mid fall weather is having an adverse effect on the coal industry, making current demands comparatively small. The demand for domestic grades continues fair, mainly because of anticipatory buying. The screenings situation is becoming worse than it was last year. It seems that 40c. is regarded as a good price in the open market. Mines are compelled to sacrifice them in order to be able to produce domestic coal to fill orders.

Lump coal sells at \$1.75 at the mines and mine-run, No. 4, at \$1.20. The mine schedules are somewhat reduced and cars are now in ample supply. Railroad buying has not improved notwithstanding the exports of wheat and flour are the largest in the history of the trade. Buying by industrial plants is not up to normal for the season. Prices were raised Oct. 1 at some of the mines, 10 to 15c., probably those that had not made the similar advance noted a week or two before. This is on domestic grades, in order to get a fair average when screenings are sacrificed, and also because it has been the custom to shove the price up Oct. 1.

ST. LOUIS

Heaviness in the steam sizes still the controlling factor in the market. Some mines are caught up on domestic orders.

An unlooked for depression in the demand for high-grade coal caused a slump about the first of the month, and this, together with the demoralized condition of the steam market, brought about a deplorable condition. Several of the mines in Williamson and Franklin County, however, are well sold up on lump and egg, and are behind in their orders. This is chiefly on account of their inability to move the steam sizes, which have been accumulating on the tracks and has resulted in the railroads refusing to give these mines equipment for their lump and egg orders.



Other mines, more fortunate in moving their smaller sizes, are now caught up on the lump and egg orders and are finding it somewhat hard to get a fair price for those sizes. The steam market shows no improvement. The washed market on Nos. 1 and 2 is picking up some, but the other sizes are dull. In the Standard field screenings are still given away for the freight, and the top of the market is about 10 to 15c. on exceptionally good coal. Even with this condition, Standard 2-in. lump can be bought for as low as \$1.05 in some cases, although the circular is \$1.10 to \$1.15.

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump.....			\$1.25	\$1.10@1.15	\$1.15
3-in. lump.....			1.40		
6-in. lump.....	\$1.60@1.85		1.50	1.25@1.35	1.40
Lump and egg.....	1.85@2.15	\$2.25			1.35
No. 1 nut.....	1.25@1.35			0.75@0.80	
Screenings.....	0.25@0.35		0.80@0.85	0.05	0.20
Mine-run.....	1.05@1.10			0.75@0.80	
No. 1 washed nut.....	1.55@1.65	2.25	1.50		
No. 2 washed nut.....	1.30@1.35		1.35		
No. 3 washed nut.....	1.10@1.15				
No. 4 washed nut.....	1.00@1.05				
No. 5 washed nut.....	0.15@0.20				

KANSAS CITY

Market slow as a result of the warm weather. Gas supply will not be plentiful this winter. Collections slow.

A long series of warm days in Kansas City has retarded the usual starting of fires, and the ordering of coal. The steam plants have not generally begun operations yet, and some that started the furnaces in September have drawn the fires. The retail trade is also largely waiting, though there are reports that promises of higher retail prices in October stimulated orders in nearby towns. The retail prices have not yet been advanced here. Later reports indicate that the improvements necessary to provide plenty of gas probably cannot be made in time for the cold weather now approaching. Collections are difficult, and it is suggested that this situation is also a deterrent on coal orders, retail customers postponing purchases as long as possible.

PORTLAND, ORE.

No further advance in prices anticipated. Car shortage not yet felt. Business brisk owing to increase in wood prices.

Coal dealers here are doing an active business and are having no trouble now in getting supplies from the mines or making deliveries. In fact the business is running smoother than for a long time and on a very satisfactory basis. There was some suspicion that prices would advance on Oct. 1 but dealers say this will not be necessary and no advances are now expected for some time unless it should be on lower grade coals. The railroads have managed to furnish all the cars required, and orders have been filled quite promptly.

Coal Contracts Pending

Contract No. 1—Columbus, Ohio—The Ruggery Building is in the market for 300 tons of West Virginia slack coal. Shipments are to be made at the rate of 25 tons per day, beginning Nov. 1, delivery to be made at Columbus, Ohio. All communications should be addressed to J. A. Shahan, 60 Ruggery Building, Columbus, Ohio.

Contract No. 2—Norfolk, Va.—The United States Government is in the market for 2000 tons of bituminous coal. All communications should be addressed to E. Eveleth Winslow, Lieutenant Colonel of Engineers, United States Engineer Office, Norfolk, Va.

PRODUCTION AND TRANSPORTATION STATISTICS

ANTHRACITE SHIPMENTS

Anthracite shipments for September and the first nine months of this year and last year were as follows:

	September		9 Months	
	1914	1913	1914	1913
Phila. & Reading.....	1,101,296	888,060	8,869,552	9,504,550
Lehigh Valley.....	1,290,327	1,031,376	9,550,799	9,671,928
Cent. R.R. N.J.....	824,604	788,038	6,560,049	6,795,406
Del. Lack. & West.....	893,098	834,345	7,138,223	7,357,984
Del. & Hudson.....	647,974	605,071	5,354,593	5,303,075
Pennsylvania.....	575,898	533,439	4,697,325	4,610,332
Erie.....	727,950	669,364	6,169,528	6,119,302
Ont. & Western.....	185,045	222,086	1,727,512	1,919,308
Total.....	6,246,192	5,572,279	50,067,581	51,281,885

NORFOLK & WESTERN RY.

Destination of shipments over this road for August and the first eight months of this year and last year were as follows in short tons:

	August		Eight Months	
	1913	1914	1913	1914
Coal				
Tidewater, foreign.....	96,491	190,454	1,128,573	1,253,347
Tidewater, coastwise.....	372,908	328,279	2,597,566	2,570,213
Domestic.....	1,955,074	1,932,075	12,412,256	13,646,631
Coke				
Tidewater, foreign.....			27,199	197
Domestic.....	126,515	79,156	1,067,032	748,134
Total.....	2,550,988	2,529,964	17,232,626	18,218,522

SAULT STE. MARIE CANALS

Coal shipments through the Sault St. Marie Canals for August and September were as follows:

	August			September		
	U. S. Canal	Canal	Total	U. S. Canal	Canal	Total
Anthracite	238,952	54,107	293,059	142,063	20,847	162,910
Bituminous	1,808,341	275,440	2,083,781	1,427,127	296,475	1,723,602

IMPORTS AND EXPORTS

The following is a comparative statement of imports and exports in the United States for July, 1913-14, and for the seven months ending July, 1912-13-14, in long tons:

	7 Months			July	
	1912	1913	1914	1913	1914
Imports from:					
United Kingdom.....	2,697	3,464	8,258	116	26
Canada.....	765,981	678,611	588,904	76,666	78,190
Japan.....	18,216	63,665	30,983	9,103	8,215
Austria and Tasmania.....	80,585	77,634	128,018	15,679	2,699
Other countries.....	1,924	2,810	1,831	1	150
Total.....	869,403	826,184	7,044	101,565	89,280
Exports:					
Anthracite					
Canada.....	1,606,457	2,411,892	2,175,407	378,692	328,175
Other countries.....	39,435	37,021	36,257	2,282	10,822
Total.....	1,645,892	2,448,913	2,211,664	380,974	338,997
Bituminous,					
Canada.....	5,367,821	7,120,245	4,525,830	1,576,481	1,005,859
Panama.....	289,825	321,507	168,898	42,725	17,450
Mexico.....	210,786	350,961	190,363	18,515	38,571
Cuba.....	646,462	772,366	616,574	88,088	77,880
West Indies.....	447,769	377,464	355,246	33,236	42,239
Argentina.....		48,626	112,408	20,899	15,320
Brazil.....		187,555	100,530	50,786	4,612
Uruguay.....			45,594		
Other countries.....	1,114,514	829,288	974,641	145,394	138,056
Total.....	8,077,177	10,008,012	7,090,084	1,976,124	1,339,987
Bunker coal.....	4,319,514	4,409,370	4,525,876	676,257	681,370

FOREIGN MARKETS

GREAT BRITAIN

Sept. 25—Inquiries are on a limited scale, while supplies of all qualities are plentiful. Prices are weaker in consequence and are approximately as follows:

Best Welsh steam.....	\$1.08@5.28	Best Mountmouthshires.....	\$4.14@4.26
Best seconds.....	4.44@4.68	Seconds.....	3.96@4.08
Seconds.....	4.26@4.38	Best Cardiff small.....	1.80@1.92
Best dry coals.....	4.44@4.68	Seconds.....	1.20@1.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage, and for cash payment.

Freights—The demand for tonnage is not so active but rates are about unchanged and are approximately as follows:

Gibraltar.....	\$1.68	Aden.....	\$2.22
Malta.....	1.68	Colombo.....	2.28
Marseilles.....	1.64	Sabang.....	2.28
Algiers.....	1.44	Singapore.....	2.46
Genoa, Savona.....	1.74	Las Palmas.....	1.80
Naples.....	1.74	St. Vincent.....	1.92
Venice, Ancona.....	1.86	Rio Janeiro.....	3.18
Alexandria.....	1.92	Monte Video.....	3.06
Port Said.....	1.86	Buenos Ayres.....	3.30

The London coal trade has at last begun to show signs of returning activity. The increasing export trade has given confidence to buyers, and the volume of trade doing is increasing. The delivery trade, however, continues weak, but factors and merchants are buying more freely for stock. Manufacturing qualities are in good demand, and kitchen coal and bakers' nuts are also moving better. Gas coals, although very low in price, are improving, but slacks and small nuts are still weak and plentiful. The seaborne market shows no change.

The coal markets in the provinces have benefited by the cooler weather which has prevailed during the week. On the other hand, too, there is an increasing enquiry from friendly and neutral countries. Financial conditions are still prejudicial to business, and this disadvantage has been severely felt at Cardiff, where little new business has taken place, the market in general being dull and void of special feature. On the Tyne, whilst the volume of business does not appear to have greatly expanded, the undertone of the market is good. The West Yorkshire market has become depressed, but that in the South shows a slight improvement; the reduction of output and a fair demand has served the purpose of steadying the market. In Lancashire the house coal trade has improved owing to the colder weather. The Scottish coal trade may be said to have changed little, and remains very quiet.

It is officially announced that on Nov. 4 the general moratorium will be terminated.

The South Metropolitan Gas Company has increased the price of its gas owing to the continued high price of coal.

It is announced that the Portuguese railway contract for steam coal has come to this country. This is the first coal contract which has been diverted from Germany by the war.—"The Colliery Guardian."